THE IRON TRADE REVIEW

Published Weekly
VOL. LXV. No. 24

CLEVELAND, DECEMBER 11, 1919
Entered as second-class matter at the post-office at Cleveland, Ohio, under the act of March 3, 1879

Four Dollars a Year
Single Copies 15 Cents

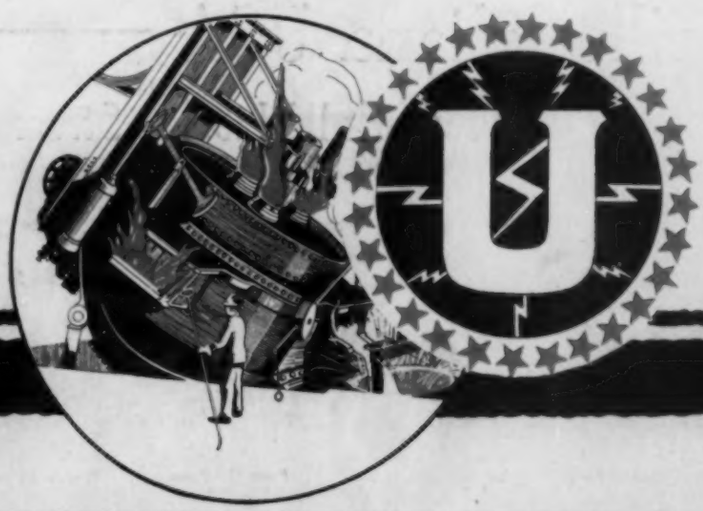
UNION ELECTRIC STEEL COMPANY

MANUFACTURERS OF
HIGH GRADE
ALLOY
STEELS

HEROULT ELECTRIC FURNACE PROCESS

CORRUGATED INGOTS AND ALLOY FORGING BILLETS

The only rejections we have received during the past years were the rejections of our own Steel Inspector—not a single one from our Customers.

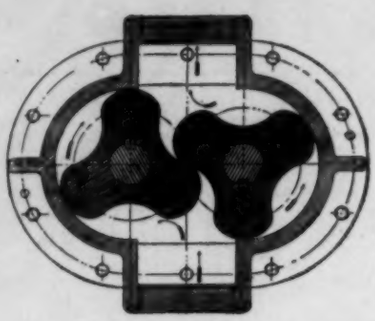


STANDARD MERCHANT SHAPES
ALL SIZES
ROUNDS SQUARES FLATS
OCTAGONS HEXAGONS

GENERAL OFFICES
KEYSTONE BUILDING PITTSBURGH, PA.
WORKS: CARNEGIE, PA.

GENERAL LIBRARY
DEC 12 1919
UNIV. OF MICH.

Advertisers' Index, pages 222-223
Engineering Directory, pages 190-191
Contents 1558 (Editorial)
"Where-to-Buy", page 130
Classified Advertisements, pages 200-221



CONNERSVILLE VALVELESS ROTARY PUMPS

Are extremely simple, rugged and efficient.

The above illustrates internal construction showing the two symmetrical rotating parts which are called impellers.

These do not come in contact with the case or with each other but are separated by a small clearance.

The pump discharges six times per revolution resulting in a smooth flow with the minimum of shock.

Heavy steel shafts are pressed and keyed into the impellers and rest in bearings of generous size which are lined with genuine babbitt.

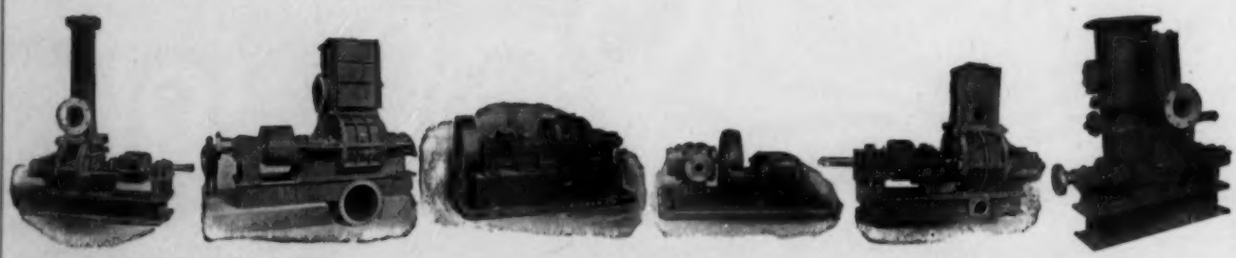
These pumps are suitable for handling nearly all liquids or for maintaining either high or low vacuums.

Quotation and descriptive matter on request.

The Connersville Blower Company

Connersville Indiana U.S.A.

Chicago, Monadnock Block New York, 114 Liberty Street



High Lift Pump | Circulating Pump | Vacuum Heating Pump | Lubricating Oil Pump | Paper Mill Pump | Pump and Condenser

THE IRON TRADE REVIEW

Vol. LXV Cleveland, December 11, 1919 *No. 24*

Coal Relief is Sorely Needed

Impending Strike Settlement Finds Iron and Steel Industry in Initial Stage of Sweeping Curtailment of Production—Scarcity of Material Grows and Makers Decline New Business—Coke Control Stays Feverish Rise

PROMISED settlement of the coal strike has come at the critical moment for the iron and steel industry when a sweeping contraction of production has seemed unescapable. Even now, it is a serious question whether the curtailment of operations already well under way can be arrested in its first stage before a free movement of coal and coke supplies to crippled plants can be restored. The past week has shown a spread of the paralyzing effects of a restriction of fuel requirements, to a degree where the loss of output, in many cases, has been more extensive than during the steel strike. Various plants which had managed to maintain operation at or only slightly below a normal basis, against direct labor disturbance, have been forced to yield sharply to the narrowed distribution of fuel. It is apparent that a few weeks more of present conditions and the iron and steel makers literally would have been swamped with deferred obligations which would have made a clearing of their books a tremendous problem.

Many Plants Crippled

The list of additional shutdowns of plants for the week as the result of the coal crisis, is a lengthy one. Many sheet mills have been forced to close and others have been crippled at a time when the shortage in this product is pronounced to be the greatest the country ever has known. The additional loss of output in tin plate and wire has been heavy. Tubular goods have been affected considerably and the largest maker has been obliged to lighten up production in its various plants. In the Youngstown district several large plants have suspended completely. A leading Pittsburgh independent has been reduced from practically 100 per cent to not over 60 per cent operations. Eight out of 12 blast furnaces at Gary, 5 out of 11 at South Chicago and one out of four at Joliet are running. The Joliet mills are down. Few merchant furnaces have been forced to bank or go out.

Under present conditions of shortage, export business is severely restricted. Some sizable sales have been made, however, including 16,000 tons of rails to Chile, and 12,000 tons of tank plates and 21,500 boxes of tin plate to Japan. The steel for a 3500-ton zinc smelter for India has been placed tentatively.

Coke Under Control

A return of government price control over coke is the culmination of a feverish week in that product. Spot coke had been sold at $10 to $12, ovens, just before the fuel administration intervened. Fixed prices now in force are $6 for furnace and $7 for foundry beehive coke, Connellsville ovens, with modifications for other districts, and $6.70 for by-product selected foundry grade. The 25 per cent curtailment of coal supplies to beehive ovens ordered by the fuel administration went into effect Monday. A further cut of 25 per cent is slated to follow Thursday, depending whether the miners accept the government's offer of settlement.

New steel orders, no matter how attractive in size or price, have been going begging. Many mills have closed their badly congested order books to every importunity or device of buyers. A Detroit automobile manufacturer has been seeking in vain to place 100,000 tons of strip steel. A 10,000-ton steel bar inquiry at Pittsburgh has elicited little interest. In the East mills have enough tonnage of steel bars to run into the third quarter and are selling considerable tonnage at 3.50c, Pittsburgh, against the regular level of 2.35c, Pittsburgh. Semifinished material can scarcely be had. A sale of sheet bars has been made at $50, Pittsburgh. In the East rerolling billets have brought $50, Pittsburgh, and slabs, $52.50.

No Stop In Iron Rise

The pig iron market is steadier though exceedingly strong and the great majority of the sellers are declining further tonnage. Valley basic and bessemer have advanced another $1 to $34 and $35, furnace. Eastern basic has reached $35, furnace. Standard low phosphorus is up to $45, furnace, in the East and to $42, valley. Chicago producers are quoting $40, furnace, on No. 2 foundry, based on $45, Birmingham, and have made various sales at this figure. The base foundry grade in other districts ranges from $36 to $38, furnace.

DECEMBER 11, 1919

THE IRON TRADE REVIEW

A weekly publication devoted to the Iron, Steel, Foundry and Metal-working Industries

Published Every Thursday by
THE PENTON PUBLISHING CO., Cleveland

BRANCH OFFICES

CHICAGO - - - - - - - - 1147 Peoples Gas Bldg.
CINCINNATI - - - - - - - - York St. and Western Ave.
NEW YORK - - - - - - - 2203-2206 No. 220 Broadway
BOSTON - - - - - - - - - 426 Old South Bldg.
PITTSBURGH - - - - - - - - 2148-49 Oliver Bldg.
WASHINGTON, D. C. - - - - - - - 40 Metzerott Bldg.
BIRMINGHAM, ENG. - - - - - - - Prince's Chambers
LONDON, ENG. - - - - - - - 16 Regent St., S. W. I.

Subscription, United States and Mexico, $4 per year. Canada $6, and other Foreign Countries, $8 per year.

Entered at the Postoffice at Cleveland as Second Class Matter

Copyright 1919 by the Penton Publishing Co.

Member, the Audit Bureau of Circulation and Associated Business Papers, Inc.

IN THIS ISSUE

	PAGE
IRON AND STEEL MARKET REVIEW	1557
EDITORIALS	1558, 1559
IRON, STEEL AND SCRAP PRICES	1560, 1616, 1618
INDEX TO MARKET REPORTS	1560
IRON AND STEEL MARKETS	1561 TO 1571
SHELLS REQUIRE UNIFORM CASTING	1573
High-explosive Shell Making Demands Consistent Ingots if the Percentage of Discards is to be Held to a Minimum—Forming Process Executed by Horizontal Hydraulic Press—Method Followed at Watertown Arsenal.	
WAGES BASED ON GUESSWORK	1579
Industrial Unrest Likely to Continue Until Unscientific Way of Paying is Done Away With—Research Bureau Proposed for Determining Value of Services—Elements Lacking for Making Collective Bargaining Effective.	
APPLYING ELECTRIC FURNACE TO FOUNDRY	1581
SELECTING LUBRICANTS FOR BEARINGS	1583
ORGANIZING MODERN STORES DEPARTMENT	1586
DEVELOPS PORCELAIN FOR INDUSTRIAL USE	1588
A.S.M.E. UNDERTAKES NEW WORK	1589
STEEL EXPORTS CONTINUE DECLINE	1593
BASING POINT FINDING FAR AWAY	1594
BUREAU WOULD EXTEND STUDIES OF STEEL	1596
COAL CRISIS DEMANDS POLICY OF WISDOM	1596
FAIR TRADING IN MACHINE TOOLS	1608
U. S. NOT TO AID FOREIGN CREDITS	1606

Who Shall Lead the Engineers?

SELDOM, if ever, does the reader who glances casually at the list of newly elected officers of an organization go to the trouble of analyzing the occupations of the office holders unless it is plainly evident from cursory examination that one profession, trade, or branch of industry is represented by an unusually large percentage of the new incumbents. Therefore, it would be interesting to know how many persons who read the names of men recently elected to office in the American Society of Mechanical Engineers, are struck by the fact that of the seven in the list, four or 60 per cent are identified with institutions of learning or technical branches of departments of the federal government.

Were this high percentage an exception to the general rule, it would not be significant. However, there always has been a tendency to place theoretical engineers, scientists, etc., at the head of and in charge of the policies of so-called engineering societies. Notwithstanding the fact that the names of many notable, practical and successful engineers and manufacturers, such as Henry R. Towne, Charles E. Billings, John Fritz, Worcester R. Warner, S. T. Wellman, Ambrose Swasey and George Westinghouse, appear on the list of the past presidents of the society, the majority of the presidents have come from the laboratories and classrooms of technical and engineering schools.

The preponderance of college men is even more noticeable in the activities of the engineering societies. Most of the committee work is undertaken by men associated with educational institutions, and in recent years, investigators with the United States bureau of mines and bureau of standards have carried a particularly heavy part of the burden imposed upon the members of the technical societies.

In view of these facts, one is tempted to ask why engineers and manufacturers who daily apply their technical training to practical problems do not take a more active part in the affairs of the societies. Can it be possible that the men who practice engineering as an adjunct to business do not have time to indulge in these activities, or is it true that the work of the engineering societies has acquired the hallmark of the class room, and therefore no longer interests practical men? These questions merit close attention, particularly by those who are charged with the successful guidance of the policies of the large engineering organizations. It should be possible to bring theoretical and practical men together on common ground, and any tendency which seems to point toward the domination of the engineering field by one faction to the detriment of the other should be checked before harm is done.

When Sanity Finally Returns

RESTORATION of the governmental wartime prices and regulations on coke have been the inevitable result of a continuance of the present acute shortage of coal which for the nation at large is becoming more desperate daily. This has followed quickly upon the pronouncement of the central coal committee to sharply restrict the supply of coal to beehive ovens, starting Dec. 8. The effect of this order plus the increased shortage of coal was to precipitate a violent rise in the spot coke market at the close of last week. Spot Connellsville coke then, it is understood, readily bought from $10 to $12 per ton as compared with $6.50 to $7 in the week preceding. The taking over of the control of the market by the fuel administration under the Lever act, which still is in force, then was announced. Under these regulations the beehive product is fixed at $6 ovens for 48-hour or furnace fuel and at $7 ovens for 72-hour or foundry coke subject to such modifications as fit local conditions. Under these latter Wise county Virginia furnace coke is listed at $7.25 ovens and foundry at $8.25 and New River and Pocohontas coke in West Virginia, at $8 ovens for both furnace and foundry grades. Selected by-

product foundry coke is placed at $6.70 base and run of oven, $5.70 base. To these base prices on by-product coke there is added the freight rate from the competing beehive coke district which takes the lowest rate to the point where such by-product coke is produced.

The return of the coke market to a fixed price basis under government control, reflects clearly the critical stage to which the stubborn attitude of the coal miners has brought the iron and steel industry and all other commercial and manufacturing activities of the country as well. This week has seen the beginning of a slowing down of production of iron and steel mills and blast furnaces on a large scale. If this situation is to continue unrelieved for an indefinite period, the consequences which would be freed could be nothing but disastrous for the country at large. Added to the large loss of output occasioned by the steel strike, it would pile up the arrearage of supply so overwhelmingly that it would be practically impossible for the mills ever to catch up, in view of the present excessive demand.

From the standpoint of business stability and the well-being of the whole country, the situation has reached the point where drastic measures are warranted and demanded. It is well that the coal miners at last have come to their senses and have appreciated this fact. In accepting the government's final offer of settlement they have spared themselves from a responsibility that would have become so heavy that no class or set of men lucidly could care to assume it before an outraged public. And they have avoided jeopardizing whatever of their honest dues and rights are tied up in the present controversy.

Pig Iron Registers Comeback

AS WAS predicted, failure of the steel strike was accompanied by a spectacular comeback in pig iron production, which was particularly noticeable during November. Inasmuch as the effect of any disturbance or impetus to production usually is not registered until the following month, the pig iron output of October indicated the degree to which blast furnace operation was affected during the early days of the strike, while the November record measures the recuperation after the breaking of the strike in October.

The production for November was 2,397,175 tons, a gain of 532,751 tons over the preceding month, bringing the total to within 84,000 tons of the September figure. But while October registered a large loss, merchant production increased over September, indicating that the steelmaking stacks suffered a loss greater than that represented by the total net loss. It is significant, therefore, that 87 per cent of the gain of November was made by the steelmaking stacks. These furnaces produced 1,732,296 tons, or 462,629 tons more than were produced in October, while merchant furnaces with 644,189 tons made a gain of 69,670 tons.

More noteworthy is the fact that of a net gain of 36 stacks placed in blast during the month, 32 were steelmaking stacks while only four were merchant stacks. Only 14 fewer furnaces were in blast on Nov. 30 than on Aug. 31 when the third highest number during the year was in operation. These figures prove conclusively that the steel strike affected the industry seriously for only a brief period and were it not that the coal shortage now is curtailing production, the December pig iron output would be practically normal.

Independents Rise to Power

THAT preponderant influence in the steel industry has not been used to repress competition and destroy rivals for trade is clearly shown in the wonderful growth of independent companies which have sprung up and prospered since the formation of the United States Steel Corp.

Taking an outlying province of the steel area as an illustration, the same situation being true of other localities, the Chicago field indicates that the presence of the stronger competitor has been no bar to success of other companies. Though represented in the Chicago district by four plants, two of which are among the largest and most efficient in the country, with an immense annual output, the leading interest has seen its competitors organize and grow rapidly. The Inland Steel Co., starting 17 years ago as little more than a rerolling proposition, now is fully integrated from ore mines to finishing mills and has grown to a capitalization of $30,000,000. This growth has been made since the Steel corporation was organized.

The Interstate Steel & Iron Co. is another example of the growth of a small bar iron mill to a position where it assumes rank with the larger steel interests. This company has three well equipped plants and a large capitalization, enjoys widespread trade, and markets a broad line of products. It is still growing and promises soon to occupy an even larger field.

That such expansion has gone on during the past few years in direct competition with the largest interest indicates that the steel business is conducted on lines which give every manufacturer freedom for initiative and development. The records of establishments which have grown into powerful organizations form significant proof of the stability and integrity of the iron and steel industry and of the men whose counsel wisely prevails.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE, ORE AND OTHER PRICES ON PAGES 1616 AND 1618

Pig Iron

Bessemer, valley	$35.00
Bessemer, Pittsburgh	36.40
Basic, valley	34.00
Basic, Pittsburgh	35.40
Basic, delivered, eastern Pa.	33.00 to 35.00
Malleable, Pittsburgh	37.65
Malleable, Chicago, furnace	35.50
Malleable, Buffalo, furnace	39.25
Malleable, delivered eastern Pa.	36.00 to 38.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X Eastern and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 and up
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern delivered Phila.	$42.10 to 44.10
No. 1X, Buffalo	41.00
No. 1 foundry, Chicago, furnace	36.25
No. 2 foundry, valley, Pittsburgh	37.40
No. 2 foundry, Buffalo	38.00
No. 2 foundry, Boston	41.50 to 42.50
No. 2 foundry, Chicago furnace	35.00
No. 2 foundry, Ironton furnace	35.75 to 36.75
No. 2 foundry, Cleveland furnace	35.00 to 36.00
No. 2X, eastern, del., Phila.	40.10 to 41.10
No. 2X, eastern, N. J., tidewater	40.10 to 41.10
No. 2X, eastern, Boston	41.90 to 42.90
No. 2X, foundry, Buffalo furnace	39.25
No. 2 foundry, del., Philadelphia	39.10 to 40.10
No. 2 foundry, N. J. tidewater	39.10 to 40.10
No. 2 southern, Birmingham	34.00 to 35.00
No. 2 southern, Cincinnati	37.60 to 38.60
No. 2 southern, Chicago	37.00 to 38.00
No. 2 southern, Phila.	38.50 to 39.50
No. 2 Southern, Cleveland	37.00 to 38.00
No. 2 southern, Boston	43.00 to 44.00
No. 2 southern, St. Louis	38.25
Virginia, No. 2X, furnace	38.25
Virginia, No. 2X, Philadelphia	42.35
Virginia, No. 2X, Jersey City	42.65
Virginia, No. 2X, Boston	43.70 to 44.70
Gray forge, valley, Pittsburgh	34.40
Gray forge, Buffalo	32.00 to 33.00
Gray forge, eastern Pa.	34.50
Silveries, 8%, furnace	50.00
Ohio Silveries, 8%, Chicago	46.80
Tennessee Silveries, 8%, Chicago	48.65
Low phos. standard, Phila.	48.80
Low phos. Lebanon, furnace	40.00
Low phos. standard, Pittsburgh	43.40
Charcoal, Superior, base grade, Chicago	42.50 to 44.50

Coke

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	7.25
Wise county foundry	8.25

Ferroalloys

Ferromanganese, 80 per cent, delivered, domestic metal	$120.00
Ferromanganese, 80 per cent, English c.i.f. Atlantic ports	110.00
Spiegel, 18 to 22 per cent furnace spot	38.00 to 40.00
Ferrosilicon, 50 per cent, spot and contract, delivered	80.00 to 85.00
Ferrotungsten, standard, per pound contained, furnace	1.10 to 1.20
Ferrochrome, 60 to 70 per cent chromium, 6 to 8 per cent carbon, per pound contained, maker's plant	27c to 29c
Ferrovanadium, 35 to 40 per cent per pound contained, according to analysis	$5.50 to $7.00
Ferro carbon-titanium, carloads, producers plant, per net ton	200.00
Bessemer, ferrosilicon, 10 per cent	59.50
Bessemer, ferrosilicon, 11 per cent	62.80
Bessemer, ferrosilicon, 12 per cent	66.10

Prices at Jackson and New Straitsville, O.

Semifinished Material

BILLETS AND BLOOMS

(4 x 4 inch)

Open-hearth, Pittsburgh	43.00 to 45.00
Open-hearth, Philadelphia	54.00
Open-hearth, Youngstown	43.00 to 45.00
Bessemer, Pittsburgh	43.00 to 45.00
Bessemer, Youngstown	43.00 to 45.00
Forging, Pittsburgh	51.00 to 56.00
Forging, Philadelphia	64.00

SHEET BARS

Open-hearth, Pittsburgh	$48.00 to 50.00
Open-hearth, Youngstown	48.00 to 50.00
Bessemer, Pittsburgh	48.00 to 50.00
Bessemer, Youngstown	48.00 to 50.00

SLABS

Pittsburgh and Youngstown	43.00 to 45.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$60.00 to 63.00
Grooved skelp, Pittsburgh	2.45c
Sheared skelp, Pittsburgh	2.65c

Shapes, Plates and Bars

(In cents per pound)

Structural shapes, Pittsburgh	2.45c
Structural shapes, Philadelphia	2.695c to 2.925c
Structural shapes, New York	2.72c to 2.95c
Structural shapes, Chicago	2.72c
Tank plates, Pittsburgh	2.65c to 2.75c
Tank plates, Chicago	2.92c
Tank plates, Philadelphia	2.895c to 2.995c
Tank plates, New York	2.92c to 3.02c
Bars, soft steel, Pittsburgh	2.35c to 2.50c
Bars, soft steel, Chicago	2.62c
Bars, soft steel, New York	2.62c to 3.77c
Bars, soft steel, Philadelphia	2.549c to 3.745c
Bar iron, common, Phila.	3.245c
Bar iron, common, Chicago	2.77c to 3.00c
Bar iron, common, Cleveland	3.25c
Bar iron, common, New York	3.27c
Bar iron, common, Pittsburgh	3.25c
Hard steel bars, Chicago	2.85c

Rails, Track Material

Standard bessemer rails, mill	$45.00
Standard open-hearth rails, mill	47.00
Relaying rails, light, St. Louis	40.00 to 46.00
Relaying rails, Pittsburgh	40.00 to 43.00
Angle bars, Pittsburgh base	2.75c
Angle bars, Chicago base	2.75c
Light rails, 25 to 45, mill	$2.10 to 2.45
Spikes, railroad, Pittsburgh	3.35c
Track bolts, Pittsburgh	5.00c
Track bolts, Chicago	4.62c
Track spikes, Chicago	3.62c
Tie plates, Chicago	2.75c to 2.90c

Wire Products

(100 lbs. to jobbers, carloads; retailers, 5c more)

Wire nails, Pittsburgh	3.50c
Plain wire, Pittsburgh	3.10c to 3.25c
Galvanized wire, Pittsburgh	3.80c to 3.95c
Barbed wire, painted, Pitts.	3.50c
Barbed wire, galvanized, Pitts.	4.20c
Cut nails, Pittsburgh l. c. l.	5.195c
Coated nails per count keg, Pitts.	3.10c to 3.25c
Polished staples, Pittsburgh	3.50c
Galvanized staples, Pittsburgh	4.20c

Chain, Piling, Strip Steel

(In cents per pound)

Chain, 1 in. proof coil, Pitts.	5.75c
Sheet piling, base, Pittsburgh	2.55c

Cold rolled strip steel, hard coils, 1⅛ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.00c.

Sheets

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	4.35c
No. 28, bessemer, Pitts.	4.35c
No. 28, open-hearth, Chi.	4.62c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	4.35c
No. 28, bessemer, Pitts	4.35c

GALVANIZED

No. 28, open-hearth, Pitts.	5.70c
No. 28, bessemer, Pitts.	5.70c
No. 28, open-hearth Chi	5.97c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.55c
No. 10 bessemer, Pitts.	3.55c
No 10, open-hearth, Chi.	3.82c
No. 10, open-hearth, Phila.	3.995c to 4.095c

Full sheet schedule page 1616.

Tin Plate

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.00

Iron and Steel Pipe

Base Pittsburgh to Jobbers Carloads

Base, Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	57½	44
¾ to 3 in., butt, iron	34½	18½

Full pipe schedule page 1616.

Boiler Tubes

Steel, 3½ to 4½ inches, l. c. l.	40⅛
Iron, 3½ to 4½ inches, c. l.	16

Cast Iron Water Pipe

Without War Freight Tax

(Class B Pipe)

Class A pipe is $2 higher than Class B

Four-inch, Chicago	$65.80
Six-inch and over, Chicago	62.80
Four-inch, New York	65.30
Six-inch and over, New York	62.30
Four-inch, Birmingham	59.00
Six-inch and over, Birmingham	56.00

Hoops, Bands, Shafting

Hoops, Pittsburgh	3.05c
Bands, Pittsburgh	3.05c
Hot rolled strip steel, Pitts. stamping quality	3.50c
Cold finished steel bars, Pitts., base	3.60c

Rivets

Structural rivets, Pittsburgh	3.90c to 4.15c
Boiler rivets, Pittsburgh	4.00c to 4.25c
Rivets ⅞ in. and smaller Pitts.	50 to 50—10 off

Nuts and Bolts

(Prices f. o. b. Pittsburgh)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	45–5 to 50–10 off
Cut thread	40–5 to 50–10 off
Larger and longer	30–10 to 40–10 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–7½ to 60 off
Cut thread	40–10–5 to 50–10 off
Larger and longer	40 to 40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–5 off
Cold pressed semifinished hexagon nuts ⅝ in. and smaller	70–10–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c to 2.70c off
Hot pressed, square tapped	2.25c to 2.45c off
Hot pressed, hexagon blank	2.50c to 2.70c off
Hot pressed, hexagon tapped	2.25 to 2.45c off
Cold pressed, square tapped	2.25c to 2.45c off
Cold pressed, square blank	2.50c to 2.70c off
Cold pressed, hexagon blank	2.50c to 2.70c off
Cold pressed, hexagon tapped	2.25c to 2.45c off

Market Report Index

	Page
Weekly Market Review	1557
Pig Iron	1561
Coke	1563
Scrap	1564
Sheets	1565
Tin Plate	1565
Wire	1565
Bars	1566
Nuts, Bolts, and Rivets	1566
Cars, and Track Materials	1566
Ferroalloys	1567
Plates	1567
Merchant and Cast Pipe	1569
Nonferrous Markets	1568
Structural Shapes	1568
Warehouse	1569
Semifinished Steel	1569
Export Market	1570
British Market	1571
Refractories	1600
Coke By-Products	1607
Machine Tools	1608
Chain	1567
Cold Finished Strip Steel	1569

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Prices are those ruling on the largest percentage of sales at the dates named.

	Price Dec. 10, 1919	Average prices Nov. 1919	Sept. 1919	Dec. 1918
Bessemer valley, del., Pittsburgh	$36.40	$32.00	$29.35	$36.60
Basic, valley, delivered, Pittsburgh	35.40	30.40	27.15	34.40
*No. 2 Foundry, Pittsburgh	37.40	33.15	28.15	35.40
*No. 2 Foundry, Chicago, furnace	40.00	31.75	26.75	34.00
Lake Superior charcoal, Chicago	42.50	35.50	32.75	38.70
Malleable, valley	36.25	31.75	28.65	35.90
Malleable, Chicago	35.50	32.25	27.25	34.50
*Southern, No. 2, Birmingham	35.00	30.65	26.75	35.25
*Southern Ohio, No. 2, Ironton	36.00	31.75	26.75	34.00
Basic, eastern del., eastern Pa.	34.00	33.00	27.00	36.90
**No. 2X, Virginia, furnace	38.25	33.40	29.25	38.00
*No. 2X, eastern del., Philadelphia	40.60	35.85	29.95	39.15
Gray forge, valley del., Pittsburgh	35.40	31.80	27.15	34.40
Ferromanganese, 80 per cent, delivered	120.00	110.00	105.00	240.00†
Bessemer billets, Pittsburgh	45.00	40.90	38.50	47.50
Bessemer sheet bars, Pittsburgh	48.00	45.00	42.00	51.00
Open-hearth sheet bars, Pittsburgh	48.00	45.00	42.00	51.00
Open-hearth billets, Pittsburgh	45.00	40.90	38.50	47.50
Steel bars, Pittsburgh	2.50c	2.45	2.35	2.90
Steel bars, Chicago	2.62	2.62	2.62	3.17
Iron bars, Philadelphia	3.245c	2.895	2.595	3.745
Iron bars, Cleveland	$3.25	$3.00	$2.52	$3.64
Iron bars, Chicago mill	2.77c	2.73	2.62	3.50
Beams, Chicago	2.73	2.73	2.73	3.27
Beams, Pittsburgh	2.45	2.60	2.45	3.00
Beams, Philadelphia	2.695	2.695	2.695	3.245
Tank plates, Pittsburgh	2.70c	2.65	2.60	3.25
Tank plates, Chicago	2.92	2.92	2.92	3.52
Tank plates, Philadelphia	2.995c	2.895	2.845	3.395
Sheets, blk., No. 28, Pittsburgh	4.35	4.35	4.35	5.00
Sheets, blue anld., No. 10, Pittsburgh	3.55	3.55	3.55	4.25
Sheets galv., No. 28, Pittsburgh	5.70	5.70	5.70	6.25
Wire nails, Pittsburgh	3.50	3.45	3.25	3.50
Connellsville furnace coke	6.00	5.80	4.60	6.00
Connellsville foundry coke	7.00	6.95	5.90	7.00
Heavy melting steel, Pittsburgh	24.50	21.90	20.50	27.50
Heavy melting steel, eastern Pa.	24.00	20.80	19.00	24.75
Heavy melting steel, Chicago	21.00	20.65	19.00	26.50
No. 1 wrought, eastern Pennsylvania	31.00	27.85	27.00	33.50
No. 1 wrought, Chicago	27.00	26.50	21.25	29.65
Rerolling rails, Chicago	31.50	31.15	25.40	30.40

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon. †70 per cent.

Pig Iron Market Grows Steadier

Advance of Prices Continues But Situation is Less Excitable—Chicago Producers Sell No. 2 Foundry at $40—Valley Basic Reaches $34 and Bessemer $35—Low Phosphorus in East Sells at $45

Pittsburgh, Dec. 9.—Another $1 per ton has been added in the past week to the price here on the three base grades of pig iron. Sizable sales of No. 2 foundry (1.75 to 2.25 silicon) for the first half from a valley furnace are noted at $36 furnace; of 3000 tons of standard bessemer for first half, at $35 furnace; and of a tonnage of basic, at $34 valley furnace. Lots of less than 1000 tons of both No. 2 foundry and standard bessemer have been made at least $1 above these quotations, but on basic $34 seems to be the top even on small tonnages. Where there is no lack of demand from consumers of this grade, many seem hesitant to pay more than that price. The market from certain indications has lost some of the excitement which recently characterized trading but this condition reflects unwillingness on the part of producers to accept much business at current levels rather than because buyers have fully covered their requirements. A number of consumers of all grades have not yet contracted for their first half of 1920 requirements and the remaining unpledged supplies have been reduced still further by the fact that a number of merchant furnaces, because of recent suspensions, will carry over considerable 1919 business into next year. In this connection, it is reported that one valley furnace has obligations amounting to 35,000 tons of basic, equal to about three months' production by this furnace. A Wheeling sanitary ware manufacturer is in the market for 2000 tons of No. 2 foundry and an equal tonnage of the same grade is being sought by one of the radiator companies in Johnstown, Pa. It is reported that about 2000 tons of No. 2 foundry is under negotiation by a Pittsburgh district consumer at $38 with a western Pennsylvania furnace interest. Most of the producers of foundry iron already are committed for all but a small portion of their first half production. A sale of 3000 tons of standard bessemer for first half was made to a Paden City, W. Va., maker of melting bars, and the buyer it is understood was quoted as high as $39 against this inquiry. Curtailment of production of beehive oven coke has not yet seriously affected the operation of blast furnaces in this district. The Carnegie Steel Co. has banked one of its city stacks for want of fuel. Three furnaces of the Jones & Laughlin Steel Co. have been banked because of coke shortage and one stack at Aliquippa has been blown out for relining.

Virginia Makers Sell Tonnage

Boston, Dec. 8.—Pig iron prices continue to mount in the New England market. The feature of the week was the opening of books by two Virginia furnaces for sales for prompt delivery. Both of these furnaces came in at a $35 price for the base grade (1.75 to 2.25 silicon) and both rapidly raised prices until in one case an advance of $3.50 was made in three days. One of the furnaces sold approximately 10,000 tons for New England delivery, and the other about 5000 tons. Both are now out of the market. Prices from all districts have advanced and available supplies have been continuously tightening until at present there is scarcely any to be had for first half delivery, and comparatively little for prompt. Some southern iron has been sold but Alabama furnaces still are out of the market except in unusual cases. An eastern Pennsylvania furnace sold several hundred tons to a Massachusetts consumer at $37 furnace for No. 2X (2.25 to 2.75 silicon) for prompt shipment. Another furnace from the same territory sold 500 tons of No. 2X at $39 furnace for prompt shipment. One central Massachusetts consumer bought a special analysis iron (silicon 2.00 to 2.50 and manganese 2.00 to 2.50) at $41 Virginia furnace. Another consumer bought 1000 tons of 2.75 to 3.25 silicon iron at $39 Virginia furnace for spot shipment. Another prompt order placed in Virginia was for 400 tons of 3.25 to 3.75 silicon at $41 furnace. A prominent textile machinery manufacturer came into the market during the week for part of its first half requirements and purchased a round tonnage, partly southern and partly northern iron. Prices continue to be secondary in many transactions, the consumer's chief question being whether he can secure the iron rather than what he will have to pay. Malleable has been particularly scarce for several weeks and a consumer who wanted 400 tons during the week carried his request as far west as Ohio and even then was unable to secure the amount required.

Speculators Expect Higher Prices

New York, Dec. 8.—As an indication of their faith in higher pig iron prices, speculative interests for some weeks have been trying to pick up tonnages to be held for a profit. It is understood that the iron which has been bought during the past two to three weeks, by speculators, amounts to more than 25,000 tons, for delivery mainly next year. It is said that a

rise of $2 to $3 a ton would serve to bring out much of this tonnage. Very little iron now is to be had from the furnaces. In fact, practically the only orders makers now are taking are those which the consumers are forcing upon them. There are some exceptions. One central Pennsylvania maker now is quoting $39, furnace, on 1.75 to 2.25; $40 on 2.25 to 2.75, and $41.25 on 2.75 to 3.25 silicon. Some eastern Pennsylvania foundry was sold during the week at $38 to $40, furnace, for 2.25 to 2.75 silicon. Some moderate-sized lots of 1.75 to 2.25 silicon were sold at $38, eastern Pennsylvania furnace. As an illustration of the tendency of prices, one round tonnage of Buffalo 2.25 to 2.75 silicon foundry for first quarter was sold at $40.25, Buffalo. The top was blown off the Pulaski Iron Co.'s furnace a few days ago and the opportunity during repairs will be utilized to reline this stack. A considerable tonnage of Virginia foundry for 1920 has been sold during the past week at as high as $38.50, furnace, for 2.25 to 2.75 silicon and $40, furnace, for 2.75 to 3.25 silicon. Some business in basic has been done in this district during the past week at $35, eastern Pennsylvania furnace, and this price is the minimum on the new inquiry now before sellers here.

Fair Tonnage is Sold

Buffalo, Dec. 9.—The heavy demand for all grades of iron continues in this district, but sales are few for first half because there is very little second quarter capacity left. First quarter iron is practically not to be had, and prompt iron is a matter of a few tons to help out a hard-pressed foundryman. One furnace sold about 10,000 tons during the past week, but this is the only instance of so heavy a tonnage being contracted for. This interest still has iron to sell for first half. Another furnace interest reports the sale of a fair aggregate tonnage of No. 1X at $41 furnace. This is the first week in about a month that there has been no advance in the price of all three grades of foundry. The $38 to $41 schedule remains in effect. Malleable is being heavily sought in this market, but none is being made. One maker reports inquiries of 2000 tons, 3000 tons and 10,000 tons. This interest is out of the market for the first half. The nominal price for malleable is $39.25.

Basic Sells at $34

Cleveland, Dec. 9.—Sales of pig iron virtually are at a standstill since the uncertainty over the coal situation is keeping the furnaces, with few exceptions, out of the market. An active inquiry from consumers continues and wherever producers care to offer any material, even off-lots, this is speedily snapped up without regard to the price. The market is very strong but at just what point it rests at present is not clearly shown because of the absence of sales. It is indicated, however, that No. 2 foundry (1.75 to 2.25 silicon) is around $36 local furnace. Sales of valley No. 2 at $36 and $36.25 furnace are noted, in one case 1000 tons being involved. Early malleable also has been sold at $36.25 furnace and No. 1 foundry at $37 valley furnace. A lot of 4000 tons of basic for shipment this month to a northern Ohio steelmaker was placed at $34 valley furnace. A southern Ohio steel company is sounding the market on about 5000 tons of basic monthly for the first half of the year and will also consider second half. An Indiana foundry interest is inquiring for 5000 tons of foundry iron. The furnace of the United Furnace Co., Canton, O., has been forced out of blast on account of the coal situation at an earlier date than expected when recently it was planned to put out the stack for relining. The furnace will be out a number of weeks for relining.

Sells Misfit Tonnage

Youngstown, O., Dec. 9.—Consumers of pig iron find it practically impossible to obtain tonnages for spot shipment and consequently are turning their attention to misfit grades. Considerable business in this direction was done recently by one furnace interest in this district which disposed of 14,000 tons of off-grade basic iron at $32 valley furnace. A Cleveland dealer took about 1000 tons for resale in the East while 4000 tons were purchased by an open-hearth steelmaker in the Cleveland district. Considerable tonnages of misfit iron are available at certain valley furnaces due to irregular operation of blast furnaces after the recent suspension of several weeks.

Refusing Further Orders

Cincinnati, Dec. 8.—Producers in the South as well as in the Ironton district are very reluctant as to taking on any further business for future shipment. They claim there is no way to arrive at approximate future production costs at the present time and those whose order books are not filled for the first quarter, have decided to await developments before selling any more iron. In the South, occasional small tonnages of high silicon or off-iron for December shipment are being made to melters in need of the metal, but the total tonnage is very limited. The usual schedule of prices is not being maintained and a premium is generally paid for any iron that can be had for prompt shipment. Although $35 Birmingham, is a nominal quotation for first quarter, only a favored customer could obtain any iron at that figure or even $1 a ton higher. The last quoted price on Northern iron was $36.75 Ironton, but no recent transactions are to be noted in that district with the exception of a little silvery iron. The silvery furnaces in Jackson county are rushing repairs and all of them will be in full operation within a short time if able to get coke. Silvery iron of 8 per cent quality is quoted at $50 furnace.

Offerings Quickly Snapped Up

St. Louis, Dec. 6.—With a number of the leading producers out of the market, the demand for pig iron in this district is still a long way from satisfied. Offerings have been extremely light and are quickly snapped up. One maker at Birmingham had 1000 of off-iron for sale, but no standard grades, while several reported they had nothing of any description. Consumption, despite the coal strike, has kept up on an enormous scale. Foundries which have managed to keep in operation, are crowded with business, and could book more, were it possible to secure raw materials. Virtually nothing in the shape of spot iron is to be found and the difficulty experienced in purchasing for first half would indicate that heavy sales have been made for that period. Real apprehension is being felt by melters who have failed to provide for their needs. Deliveries from the South have been fairly good, all things considered. Some tonnages are filtering in from Chicago and other lake points, which fact has served to relieve the pressure to some extent. It is difficult to decide just what the price of No. 2 Southern foundry (1.75 to 2.25 silicon) is here. The representative of a leading Birmingham interest, which withdrew from the market early in the week, said the last price was $35 furnace for first half, but what the next would be he could not guess. It is difficult to quote a price to a customer, for the reason that it may be changed by telegraph before a sale can be closed.

Uncertainties Are Predominating

Birmingham, Ala., Dec. 9.—Uncertainties predominate in the pig iron market in the South. Many furnaces continue out of the market and numerous inquiries being received, are being passed by. In addition requests are piling in for deliveries on old contracts. The fuel situation gives promise of affecting not only the production of iron in this section during the week but also the train service, which will interfere with shipments. Sales last made were at $35 for No. 2 foundry (1.75 to 2.25 silicon). The need for iron in some sections apparently is acute. Many consumers are far from being covered for the first half. The aggregate of business booked for future delivery by Southern producers is large and the furnaces will have to be kept in steady operation to meet the demands. Local consumption is likely to become affected this week by reason of the fuel situation. The Alabama Co. started its second Gadsden furnace the past week but with short coke supply banking again may have to be necessary. Three furnaces may be out of commission by the end of the week if there is no relief.

Chicago Iron at $40

Chicago, Dec. 9.—Sales by two producers in this district seem to indicate that $40, furnace, for silicon 1.75 to 2.25, is the prevailing level. This is just equal to the delivered price of southern iron at $35, Birmingham. One interest which is practically out of the market is sometimes forced to accommodate a regular customer with a small tonnage and on such sales $39 and $40, furnace, has been quoted recently, with sales resulting. Another producer has taken about 1000 tons of foundry iron on the basis of $40, furnace, for 1.75 to 2.25 silicon. Aside from this selling local producers are out of the market.

Southern makers with one exception

are not willing to take further tonnage and none is willing to make contracts for future delivery. The exception noted above is that one producer has a small tonnage of iron for delivery during December on which $35, Birmingham, is being quoted. Not only are southern and local makers out of the market, but the Algoma Steel Co. now is not willing to sell, although it is believed it has some production for first half which has not been covered. A seller in the Chicago district has some southern iron for spot delivery running about 4 per cent silicon, which it is offering on the basis of $35, Birmingham, for 1.75 to 2.25 base. A recent sale involved 500 tons of bessemer iron at $36, valley, with $3.80 freight to Chicago, which was taken by a foundry interest. Under the fuel regulation limiting industrial operations to three days per week, demand for iron has lessened somewhat and if blast furnace operation is not curtailed equally, producers may be able to catch up to some degree on their deliveries. No interference has been made so far with deliveries of coke to blast furnace, but no one is clear as to whether they will be able to continue uninterruptedly. Although Jackson county producers of silveries are back in the market and quoting $50, furnace, for 8 per cent silicon, demand is not heavy, the price apparently being considered too high.

Low Phosphorus is Higher

Philadelphia, Dec. 9.—Low phosphorus iron has advanced sharply. About 3000 tons of standard iron for first half has been sold half at $42, furnace, and the rest at $45. The latter price now is minimum. Several thousand tons of copper-bearing iron were sold at $39 furnace. Sales since have been made at $40 and latter figure now is minimum. Basic has been sold only in small tonnages the past week, some at $35 eastern Pennsylvania furnace. The market now is $33 to $35 on the basis of recent business although the asking price now is $35 in all cases. The market on foundry iron on the basis of recent sales is $39 to $40 eastern Pennsylvania furnace for No. 2X (2.25 to 2.75 silicon) with $1 differential for No. 2 plain (1.75 to 2.25 silicon) and differential of $1 to $2 on No. 1X (2.75 to 3.25 silicon. Sales of good sized tonnages at the outside figure have been made. The minimum in central Pennsylvania now is $40 furnace No. 2X and minimum Virginia $38.25 furnace for No. 2X. Considerable inquiry continues to come out although not as much as before. The Stanley G. Flagg Mfg. Co. wants 2000 tons of basic and malleable for second quarter.

A sale of standard malleable has been made at $39 eastern Pennsylvania furnace and a liberal inquiry for this grade iron is being received by eastern makers.

The Scottish shipbuilding workers have made an application for a uniform minimum wage of 2s 2d (about 44 cents per hour).

Coke Has A Wild Week

Spot Fuel Reaches $10 to $11 Before Wartime Prices Control is Restored—May Cut Coal Allottments Further

Pittsburgh, Dec. 9.—After several weeks of exciting trading with prices moving up constantly, and culminating in sales late last week to a Pittsburgh steel company of furnace fuel at $11 ovens, the fuel administration again is functioning and has restored the wartime price of $6 for this grade and $7 for selected 72-hour coke. Announcement of the restoration of the old government maximum was made late Saturday night and applies on all new business on and after Dec. 8. Actual orders placed last week will be allowed to go forward at the prices settled on, but in the event of any reconsignment of shipments, the restored maximums are to govern the business. Contracts for first half coke already made also are unaffected by the change. Contracting for first half tonnages has ceased with the establishment of the new prices, for while a considerable tonnage still is unsold, those who have it, are loath to close at the new figure. This is because fixed price contracts closed as high as $7.50 ovens for furnace coke on sliding scales, based upon the valley price of basic pig iron, today have a value of $6.80 ovens on the present price of $34 for that grade of iron. Curtailment of the beehive oven production of coke began effective yesterday and it is rumored it may be necessary to make a further cut in the allotment of coal for the beehive ovens, even though the strike should be called off in a day or two. Officials of the Pennsylvania railroad, lines west, and the Pittsburgh and Lake Erie railroad have been instructed to stop their cars from loading coke on Wednesdays and Saturdays while the Pennsylvania railroad, lines east, is placing cars every day but only to the extent of 75 per cent of the number placed last week. Under this arrangement, ovens in the western end of the Connellsville region will not be drawn on Wednesdays and Saturdays while at the eastern end of the district, though cars will be available every day and daily drawing of ovens will be possible, there will not be sufficient cars to permit of full operations. The impression prevails here that the fuel administration will cease to function in both coal and coke once the production of the former reaches 75 per cent of normal. the supply. Sales of early foundry coke were made last week at about $10 ovens. The production of coke in the Connellsville region for the week ending Nov. 29 is estimated by the *Connellsville Courier* to have been 237,455 tons as compared with 231,304 tons in the previous week.

Deliveries Fall Behind

Boston, Dec. 8.—The government regulations on sale of bituminous coal has had the effect of increasing the demand for coke among industrial plants. Foundries in the majority of cases are fairly well supplied for this year, either through stocks on hand or by contracts. Coke deliveries however, in many cases, are falling behind due partly to car shortages and partly to the large demand for shipment. The Everett, Mass., producer reports an ample supply of coal on hand and good deliveries being made by water. None of the restrictions put into effect on account of the coal shortage have reached the by-product producers as yet and the price for spot coke still holds at $11.90 delivered.

Unusually Heavy Demand

New York, Dec. 8.—Demand for foundry coke during the past week has been unusually heavy and big sales have been made for first half involving both beehive and by-product fuel. Beehive sales were at $7, Connellsville, and in some cases at $7.50. The northern New Jersey by-product maker, who booked a large portion of the business, continues to quote $7, Connellsville, to this district, while to New England, it is quoting on the same basis as the New England producers, namely $7.50, Connellsville. It is reported that as high as $11 and $12, Connellsville, have been asked for spot foundry coke, and it is heard here that $8.75 to $9, Connellsville, was paid for spot furnace coke.

Demand Far Exceeds Supply

St. Louis, Dec. 8.—The demand for coke in this district well outstrips the demand, and with the proposed reduction in beehive product, the scarcity is likely to grow more acute. Dealers are beset with inquiries which they are unable to fill. Deliveries on contracts continue fairly good, but are arriving in a rather unusual and ragged assortment of equipment. Some contracting for the first half of 1920 has been reported, most of which has been on a basis of $7.25 ovens for foundry coke. All this business is subject to change in the present mining scale. The leading by-product distributor early in the week announced an advance of $1 on his coke, but reconsidered this action upon protest of the coal service bureau.

Production Greatly Curtailed

Birmingham, Ala., Dec. 9.—Fuel administration regulations have brought about a 50 per cent curtailment of coal supplies for beehive coke ovens in this district and by the end of the week the output of the ovens will be cut materially. Contracts are far behind. Some of the furnace companies have a supply of coke on hand that will last them 10 days or two weeks; others are not so fortunate. By-product coke ovens will not be interfered with. Prices advanced sharply in the week, foundry coke selling as high as $10, while furnace coke went to $8.

Scrap Exhibits Firmness

Effects of Enforced Reduction of Consumption Are Minimum—Cast Grades Are Scarce—Market Advances in Several Districts

FOR COMPLETE SCRAP PRICES SEE PAGE 1618

Philadelphia, Dec. 9.—Eastern steel mills lately have been eliminating dealers to some extent and been buying direct from producers. At least 2000 to 3000 tons of steel scrap were bought by mills from producers the past week at prices ranging $23 to $25 delivered which compares with $23 delivered the last price at which sizable tonnage was sold by the dealers. What the dealers now would do on any large tonnages that might be offered is not determined. Dealers say their minimum is $25 delivered on ordinary-sized tonnage. Whether dealers would offer concessions to retain their regular trade has not yet developed. There is a fair demand for railroad wrought and substitutes and higher is being paid. While there is strong upward trend in scrap prices there is greater spread due to present uncertainties. The coal strike is holding up some buying because the mills do not know whether they can operate. Cast scrap, car wheels and malleable are stronger with pig iron.

Various Grades Sell Higher

Boston, Dec. 8.—Following the unusual advance in pig iron, scrap iron and steel continues to rise. No. 1 machinery has been sold as high as $36 to consumers. A large Massachusetts foundry is offering $34 for 2000 tons, but so far has been unable to make the purchase. The large stocks of heavy melting steel piled in dealers' yards during the early summer now are finding their way in round tonnages to the Pennsylvania market centers. Dealers have paid as high as $18 for this grade in some cases. Borings and turnings have advanced. All grades of foundry scrap are in active demand. A sale of 400 tons of No. 1 cast was made during the week to an eastern Massachusetts consumer at $34.50. Heavy cast while not accumulating in large quantity is selling at $28 to $28.50. Malleable practically does not exist, and in the absence of sales the price remains nominally at $24 delivered to consumers. One Boston broker reports the past week as the best in his history.

Most Grades Advance

New York, Dec. 8.—Excepting clean cast borings, the market on scrap remains exceptionally strong. Cast borings, due to dull demand, has fallen off $1, now holding at $16.50 to $17, f.o.b. New York. But, aside from this and two instances where prices are unchanged, other materials have advanced. Heavy melting steel has gone up 50 cents, holding at $18.50 to $19, f.o.b. New York, and mixed borings and turnings have made a similar gain. City wrought and wrought pipe, grate bars, steel axles and shafting are up $1. In machinery cast, the market appears especially strong, prices having risen $2 to $27 to $28, f.o.b. New York.

Prices Show Much Firmness

Pittsburgh, Dec. 9.—In spite of the fact that the coal scarcity is affecting the operation of steel plants throughout the greater part of the country and in this market dealers have been getting a large number of suspending orders on contracts. Scrap prices are extremely slow to yield. The warning given by the intimations of a possible shutdown of the steel plants was sufficient apparently to cause a material curtailment of shipments by the dealers before actual contraction came on. While only small lots of heavy melting steel lately have been changing hands and these generally around $24.50, delivered, no round lot tonnages for the future could be obtained at less than $25 at that price. Dealers having held to their stocks through the period of the steel strike, are inclined to see through the present disturbances rather than make any sacrifices. In this attitude they are supported by some extremely high prices which evidently were paid on the December offerings of scrap by the Pennsylvania railroad, lines east. Several consumers and dealers here entered bids of as high as $24.50 for the heavy melting steel and failed to obtain a pound. The market is a shade easier on bundled and baled sheets for a little more of these grades is available than the present demand can absorb. No weakening is observed in railroad wrought for steel works use, but machine shop turnings and cast iron borings are slightly easier. Cast remains in extremely scant supply.

Uncertainty Causing Easing Up

Buffalo, Dec. 9.—Demand for all the grades on the scrap list keeps up in good volume. Heavy melting steel which began to ascend rather sharply, is stationary this week at $23.50, but large tonnages of this material are not available. Dealers still believe the market is on the rise, though the latter part of the week a lull was experienced due, it is believed, to the uncertainty over the coal supplies. The feverish demand of four or five days ago is showing a tendency to ease off. The satisfactory solution of the coal strike, will leave the market in the healthiest condition since before the steel strike. Prices remain unchanged on all grades.

Activity Has Subsided

Cleveland, Dec. 9.—Activity arising in the scrap iron and steel market a few days ago through the buying by dealers has subsided considerably, and little trading is in evidence. All the larger melters in the Cleveland district are out of the market. Many melters are hard hit by the coal shortage, and consumption of scrap has been reduced probably 25 per cent for this reason. The latter part of last week dealers were doing considerable buying of railroad steel—couplers, coiled spring, knuckles and the like—at Massillon, O., for $24.50 to $25. Almost any quantity of scrap can be bought by dealers, but little can be sold. Some negotiations are current on contracts for first half of 1920; in most cases the prices are about the present levels. Prices are unchanged with the exception of heavy cast, which has been marked up to $23 to $24.

Famine in Cast Grades

Chicago, Dec. 9.—Cast scrap is the feature of the present market and virtually a famine exists in this grade as foundries are seeking to buy more than the market offers. This condition results from uncertainty as to the delivery of pig iron, various hindrances to continued operation having reduced the supply of that material. Foundries are busy and in need of much raw material, and are turning to scrap to supply the deficiency. Dealers not able to figure all the inquiry for this class of scrap. Rolling mill grades are somewhat weaker on account of the absence of demand, all iron mills in the Chicago district being closed for lack of fuel. Steel grades are holding up well and some buying is being done in spite of reduced operation. A sale was made recently of melting steel for delivery during first quarter. Railroad offerings are unusually small. The Wabash offers 2300 tons, the Chicago, Milwaukee & St. Paul 500 tons, and the Burlington 315 tons.

Foundry Scrap in Demand

Cincinnati, Dec. 8.—Foundry scrap continues to gain strength and No. 1 cast is selling freely in carload lots to local and nearby foundries around $25.50. Mill scrap is still very slow, as the consumption has been reduced considerably, not only in the Pittsburgh district but elsewhere. A number of mills in Indiana are closed down on account of the coal shortage and a large local melter's plant is also idle for the same reason. Heavy yard accumulations of some grades of steel scrap are reported.

Upward Trend is Shown

St. Louis, Dec. 8.—The market for scrap iron and steel continues extremely irregular and nervous, but with a decidedly strong undertone. While there has been no heavy buying, the trend of prices is upward, and several material advances were marked in dealers' lists in the week. Eastern mills, according to advices received here, are buying heavily, and prices in that direction on certain materials have reached a point where it is possible to purchase here and ship at a profit. Holders are not pressing their stuff for sale. It is admitted that the immediate future of the local market is dependent largely upon the outcome of the coal strike, but regardless of how long that trouble is drawn out, scrap is scarce. Sales in the week largely were of material held on track by dealers. Cast grades, stove plate and grate bars especially

are in strong demand, with the supply virtually nil. Stove plate and light cast have been advanced $1 and No. 1 railroad cast is up $2. Rerollers are in good demand, with few coming out. Some scrap is coming in from the country. Offerings by the carriers in the week were as follows: Wabash, 2300 tons; St. Louis Terminal Railway association, 225 tons and the Missouri, Kansas & Texas, 1000 tons. All this material brought top prices.

Southern Market Very Firm

Birmingham, Ala., Dec. 9.—Dealers in old material in the Birmingham district report the market very firm. The demand for cast especially is strong. Car wheels are similarly active. Country scrap is lagging again. Consumers are urging deliveries as the shortage in pig iron continues more apparent.

Lost Tonnage

In Wire Products Now Further Increased—No Selling Being Done

Pittsburgh, Dec. 9.—Whatever gain recently has been made in the output of wire products with the passing of the strike of the steel workmen, largely has been lost in the past week through the fresh restrictions upon production imposed by the scarcity of coal. While all plants in this district are in operation, it is on a much more modified scale than recently and all makers have withdrawn from the market on new business for the present. Buyers are making persistant attempts to secure nails and both plain and barbed wire, but particularly the first named product. Quotations on nails of anywhere from $4 to $6 per keg, base Pittsburgh, are heard, but almost no business is going on and all quotations are nominal. No more attention is being paid to specifications against old orders than to new inquiries.

Supplies Still Insufficient

New York, Dec. 8.—Although output of the wire mills which were tied up by the strike is improving, there still is a great scarcity of all kinds of wire products. This is particularly true of nails and of wire for manufacturing purposes. Consumers using wire for manufacturing various kinds of goods continue to be forced to close down their plants or departments occasionally because of lack of material.

Mills Cease Selling

Chicago, Dec. 9.—After having been unable to take more than a small portion of the business offered, because of interference with production by the steel strike, wire mills have met the added handicap of fuel shortage and have retired from the market entirely. They will not sell further until the situation clears. Mill operation is being continued as far as possible, and shipments are being made on former orders to the full extent of production. Need for nails is the outstanding feature and demand for this product is unusually heavy.

Sheet Output Is Reduced

Coal Shortage Shuts Down Various Mills and Cripples Others—Valley Scarcity of Material Worst Ever Known

Pittsburgh, Dec. 9.—The coal shortage finally has resulted in the shutdown of a number of the sheet mills in various parts of the country and not a few of those still in operation are merely hobbling along, due to the fact that fuel stocks are so low that absolute economy is essential. This condition means a further backing up of business and a consequent delay in relief from the present shortage of early tonnage. Early settlement of the coal strike, however, will permit of fairly prompt resumption and since the coal strike is affecting those who buy sheets for further manufacture, as well as the manufacturers, it cannot be said that the prompt market is any tighter than it has been. Demands, however, remain large and insistent. There is no doubt that on a small part of the business substantial premiums over the regular market basis are being offered and are being accepted by some makers. At the same time the fact that both the American Sheet & Tin Plate Co. and many independent mills still are taking business from regular customers at the old basis and the premium sales involve a relatively small fraction of the total production, quotations of more than 4.35c, 5.70c and 3.55c, respectively on black, galvanized and blue annealed in the base grades hardly are warrented.

Demands Greatly Enlarged

Buffalo, Dec. 9.—The sheet demand in this district is very heavy. The mills are unprepared to cope with the demand. Five hundred tons is a minimum inquiry. One sales agency states that manufacturers seem anxious to cover on unheard of tonnages. The consumer that formerly came into the market for 100 tons for a quarter now is asking 400 to 500 tons.

Scarcity Worst Ever Seen

Youngstown, O., Dec. 9.—Not a pound of any grade of sheets is available at mills in the Mahoning valley for spot shipment and every mill is out of the market indefinitely. Never in the history of steelmaking here have the various grades of sheets been so scarce. During the war buyers found it difficult to obtain sheets but never so difficult that a few odds and ends could not be had. Conditions now however, are beyond comparison. Wasters and other sheet mill by-products have disappeared from the market, buyers taking these grades along with prime stock. No overage is being rolled which perhaps is best explained by the fact that mills for several weeks back have been taking on attractive specifications only. Consequently, present mill schedules are confined practically to merchant sizes. Any overage that is rolled, therefore, is applied on succeeding orders thus destroying all chances for a buyer to purchase any pick-up tonnages. Prices between 7.00c and 8.00c for spot black, without regard to sizes, are heard. Normal quotations for any grade of sheets are hard to determine. Large automobile companies are paying anywhere from $10 to $14 premiums for the scant tonnages they are fortunate enough to locate. The enormous demand for one-pass galvanized in light gages continues unsatisfied.

Few Mills Are Selling

Chicago, Dec. 9.—Local producers of steel sheets are entirely out of the market, and Ohio mills which have been selling some tonnage in the West find it difficult to proceed because of shortage of sheet bars. Consumers have difficulty in placing further tonnages, although demand is heavy.

Higher Prices for Blue Annealed

Philadelphia, Dec. 9.—The leading eastern maker of blue annealed sheets is sold up for the first quarter and is out of the market. Its list price was 3.75c, Pittsburgh, for No. 10. Some blue annealed has been sold in this district at 3.85c, Pittsburgh, and some consumers have offered to place tonnage at 4.00c, Pittsburgh, but the mill refused.

Reduced Scale

Of Operations is Shown Among the Tin Plate Mills

Pittsburgh, Dec. 9.—Scarcity of coal due to the strike of the miners is beginning to be felt by the makers of tin plate and where mills actually have not suspended, they are running on a reduced scale in order to make their moderate stocks of coal hold out as long as possible. One Pittsburgh independent is out of the market because of the danger of being obliged to suspend operations entirely, owing to the lack of coal and others are not anxious for new business, not only because of the insufficient fuel supply, but also because of the fact that present obligations cannot possibly be completed much before the end of the first quarter of next year. No let-up is noted in the demand and on early deliveries no trouble would be had in securing considerably more than the regular market basis of $7 per base box, Pittsburgh, for standard cokes.

To be Honor Guests

Isaac W. Frank, chairman of the executive board of the United Engineering & Foundry Co., Pittsburgh, will be the guest of honor, and E. Lowry Humes, United States district attorney for western Pennsylvania, will be the principal speaker at the annual Christmas meeting of the Pittsburgh Foundrymen's association, which will be held this year at the Elks' club, on the evening of Dec. 15.

Bar Shortage Now Acute

Many Mills Out of Market and Attractive Business Goes Begging—10,000 Tons Up at Pittsburgh—Deliveries in Doubt

Chicago, Dec. 9.—Steel bar mills are out of the market in the Chicago district and will not accept further business at present. This is due to the cumulative effect of various delays to production, the coal strike being the latest and most demoralizing. Orders for soft steel bars have been booked in unusual volume and most producers have sufficient business to cover practically all their first half production under ordinary operating conditions. With the delay incident to fuel difficulties, which is an unknown quantity at present, it is difficult to estimate how much bar tonnage may remain unsold. Under these circumstances, it is practically impossible to promise delivery and it is considered best to remain out of the market. Holders of contracts are specifying freely and not allowing any tonnage on books to lapse. The quotation is 2.62c, Chicago. All bar iron mills in this district are idle for lack of fuel and demand for this product is strong without possibility of placing business definitely. One producer already has sufficient tonnage on books to insure six weeks continuous operation, but prospects are that nothing can be produced before the first week in January, as coal cannot be obtained before that time under the best combination of circumstances. One producer is understood to be booking new business on the basis of 2.87c, Chicago, for first quarter while others are not willing to take anything further at present.

Mills producing hard bars from old rails are closed down on account of fuel shortage and in the face of heavy demand. Most mills are willing to accept contracts for delivery at convenience, with the price specified as that prevailing at the time of delivery. The last quotation on sales was 2.85c, Chicago.

Running Into Third Quarter

Philadelphia, Dec. 9.—Steel bar orders continue virtually to rain in on mills and in a good many cases latter have enough tonnage to run into third quarter of next year. Sales of round tonnages for first and second quarters have been made the past week at 3.50c, Pittsburgh, for commercial steel bars and at 3.75c for forging quality.

Shortage is More Acute

Pittsburgh, Dec. 9.—No relief yet is apparent from the shortage of merchant steel bars which has existed for several weeks; on the contrary, it is more acute than ever as production is feeling the effect of the coal scarcity and this spells a further backing up of live obligations of the manufacturers. The fact that the jobbers who entered the strike period with fairly large stocks of bars have become sold down to bare boards under the heavy demands of the past few months makes it extremely difficult for buyers to secure early tonnages at any price. Jobbers as well as the larger users of bars are making frequent inquiries for supplies but their demands are getting almost no attention regardless of price. An inquiry for 10,000 tons of bars from a Pittsburgh district maker of cold-finished steel is current but is getting no more attention than some of the smaller lots. The Carnegie Steel Co. continues to quote 2.35c base Pittsburgh, and is taking business at that figure although from the condition of its order books, deliveries hardly can be made against new bookings before the second quarter of 1920. Few of the independent companies would consider business at less than 2.50c and offers of 2.75c from buyers recently have been numerous. Illustrative of the tight situation in bars, a Detroit automobile manufacturer recently called for 2500 tons rolled from shell billets at a price of 3.50c, base Pittsburgh. Makers of iron bars are heavily sold up and while no change has been made in prices there are intimations of a further advance. Much business in iron bars is being turned away.

Business Still Backing Up

Pittsburgh, Dec. 9.—Due to the coal scarcity, production of merchant steel bars here is not making much headway and lacking supplies, the makers of cold-finished steel bars dependent upon outside sources are not able to increase operations or to materially reduce their obligations. Actually there has been a further backing up of business, especially in the smaller sizes of rounds and squares in which the scarcity of merchant bars is most acute. While the steel strike virtually is over, the coal strike looms up as a fresh restrictive influence. Makers still are quoting a base of 3.60c, Pittsburgh, for cold-finished bars although some sales have been made to manufacturers at warehouse quotations who ordinarily have enjoyed the jobbers' price.

Buying 1920 Bolts

Chicago, Dec. 9.—Production of bolts and nuts is somewhat uncertain under present fuel conditions as this industry is not regarded as essential and many producers are unable to operate their plants because of inability to obtain power. Demand is heavy and as this is the season when contracts for first quarter usually are made, the volume of business offered is unusually heavy. Makers expect to be able to care for the requirements of their regular trade, but have not figured on inquiries from outsiders. Prices prevailing are those which have been in effect for the past month.

Still Turning Away Business

Pittsburgh, Dec. 9.—Makers of nuts and bolts in this district have so much business before them and are having so much difficulty securing early shipments of bars that they are unable to give any attention to new demands and in fact, are turning away a large number of orders. The situation in rivets is not quite so acute but because of the raw material situation the Pittsburgh district makers are not taking business at less than 4.15c for structural rivets and 4.25c for boiler rivets.

Premiums are Obtainable

Pittsburgh, Dec. 9.—While makers of hoops and bands generally are holding to the old base of 3.05c, base, Pittsburgh, on both products and the Carnegie Steel Co. is taking business at that figure, it is stated that buyers willingly would pay 4.05c, Pittsburgh, to secure early tonnages. Makers are heavily committed, especially on bands, on which manufacturers of automobile accessories ordered freely some time ago. Pressure for delivery against these contracts is heavy, but buyers still are getting only a portion of their commitments, for even before the coal strike began to restrict production, new business was running ahead of output.

More Rails Are Sought

Chicago, Dec. 9.—While none of the contracts for standard steel rails now under negotiation has been definitely closed, due to the difficulty of determining whether the railroads themselves or the railroad administration will be charged with buying for 1920 delivery, the tonnage for western roads under consideration is growing steadily and now involves about 400,000 tons. Some of the contracts have been carried to a point of completion, requiring only a final signing and mills regard them as binding on themselves, realizing that the railroads cannot commit themselves definitely under present circumstances. Demand for light rails is strong and until the last few days tonnages were being booked for both export and domestic use. No inquiries for cars are being put out at present, but an inquiry has been received recently for 3000 tons of steel, largely plates, for repair work by a carbuilder.

Mills Fairly Busy

Pittsburgh, Dec. 9.—Makers of standard rails have a fair amount of business before them although recent orders have been entirely in small lots. Just when orders for the rails for which the Pennsylvania railroad recently entered reservations will be placed is considered problematical. There seems to be an impression, however, that even though the railroads now under governmental direction go back to private management on Jan. 1 it will be some time thereafter before the question of finances will be ironed out and few are looking for the

orders until well after the turn of the year. Not much is going on in splice bars nor in track bolts at present and inquiries for standard spikes are merely for the purpose of locating supplies. Although standard spikes still are quoted at 3.35c, Pittsburgh, small spikes have moved up further.

Form Sand Company

Youngstown interests have formed the Youngstown Silica Sand and Sand Products Co., capitalized at $200,000, for the purpose of developing the company's holdings of 114 acres situated about four miles south of Mercer, Pa. A recent survey of the company's deposit indicates that the silica rock formation is about 90 feet deep and extends over 50 acres. In addition, the holdings include molding sand, gravel and building sand. A plant, having a capacity for crushing 500 tons of silica rock per day, is to be built soon. The directors of the company include G. E. Burke, R. C. Krause, R. E. Holway, F. M. Van Esbeck, R. T. Miller and J. R. Riley. Offices are located at 909 Home Savings & Loan building, Youngstown.

Japan Buys Tank Plates

Placed 12,000 Tons at Pittsburgh at 2.65c—Sell in East at 2.75c—Shipbuilders Still Get 2.50c From Some Mills

Pittsburgh, Dec. 9.—Huge demands are being made upon platemakers in this district from the builders of tanks who are heavily crowded with business, both foreign and domestic. The Treadwell Construction Co., Midland, Pa., recently booked 60 tanks for export to Japan, each calling for 200 tons of plates. It is understood this business was placed at the full market price of 2.65c, Pittsburgh. Another order for 10,000 tons of tank plates also was placed here at that price. Not much business is coming out in ship or car plates but the mills are well filled up and one maker is not quoting against new inquiries for the present because of the possibility of being obliged to shut down on account of the coal scarcity and also because this manufacturer wants to keep up operations in those products where the backlog of business is heaviest, with an idea of reducing the obligations.

Much Tonnage is Refused

Philadelphia, Dec. 9.—Plate orders continue at a brisk pace and eastern mills, due to full boks, are turning away more tonnage than they are accepting. The minimum price for eastern mills continues 2.75c, Pittsburgh, at which figure sales have been made for first quarter. Some shipbuilding tonnage is being taken occasionally at 2.50c, Pittsburgh, by mills making a special drive for this work. Export orders continue in most cases to be refused.

Sells Tonnage at 2.75c

Youngstown, O., Dec. 9.—Increased demand for plates is coming out in this district. Approximately 2000 tons of tank stock were sold last week at 2.75c, Pittsburgh. Plate mills here are well booked and indications are that before the end of the year, little tonnage will be available for first quarter distribution.

Could Sell More Plates

Chicago, Dec. 9.—While demand for steel plates has been heavy during the past several months, producing capacity of this form of steel has been enlarged so materially that mills are able to care for a tremendous tonnage, and recent demand has not been sufficient to take the entire output to the extent that has obained in some other products. However, under present conditions of fuel supply, mills now are not willing to book further tonnage until they are able to estimate their remaining production for the first half of 1920. After the situation clears, it is assumed the inquiries for this material can be given consideration. The leading interest recently closed 7000 tons of ship material, mostly plates, for tankers to be built by a Pacific coast yard. An inquiry is current for 3000 tons of steel, mostly plates, for car work.

English Ferro Withdrawn

New York, Dec. 8.—Sales of ferromanganese made by interests in this district during the past week total 4000 to 5000 tons, and probably more. At least 2000 tons involved English metal guaranteed to contain 76 per cent or more of manganese, for shipment over the first quarter. This English metal was sold at $110, c.i.f. tidewater, and since these sales, further offers have been withdrawn. The remainder of the tonnage sold included domestic 78 to 82 per cent metal which went at $120, delivered. There is considerable inquiry still before the trade. The impression prevails generally in the ferromanganese trade that liquidation of the large stocks held earlier in the year has been thorough, and that there now is an under-production. The advancing trend in spiegeleisen prices became more pronounced during the past week, and the minimum price quoted has been $38, furnace, for 20 per cent metal. Sales aggregating more than 1000 tons have been made both at this figure and at $39, furnace, and some business has been done at $40, furnace. A fair amount of domestic business is pending. No action yet has developed on the large foreign inquiries reported a week ago.

A fair inquiry has been in the market for 50 per cent ferrosilicon for first half, but the tendency to close has not been very broad. Bethlehem Steel Co. contracted for 1000 tons. The market shows little change, quotations ranging from $80 to $85 a ton, delivered, with business reported at $82 to $83. Demand for 75 per cent ferrosilicon remains light.

Competition remains rather keen among domestic sellers in ferrochrome for next year's delivery. Quotations are unchanged at 27 to 29 cents a pound contained for alloy containing 6 to 8 per cent carbon. Chrome ore supplies are scarce and importers are slow in contracting for futures owing to high and uncertain ocean freight rates. A few hundred tons of spot New Caledonian ore recently was sold at $1 a unit

Some Sales of English Ferro

Pittsburgh, Dec. 8.—While a number of small-lot sales of domestic 80 per cent ferrosilicon have been made in this district recently, the largest transaction reported is in English material running 76 to 80 per cent. The latter sale involved 1000 tons for February-March delivery and carries a price of $110 c.i.f. Baltimore. This order was taken subject to ability of the producer to deliver as specified. All sales of domestic metal have been at $120 furnace, freight allowed, for 80 per cent with the transactions running 50 or 100 tons and usually for prompt shipment. Not much has been doing in spiegeleisen lately.

Demand for 50 per cent ferrosilicon has dwindled to small proportions and while occasional small sales are being made at $85 furnace, freight allowed, the bulk of the business is believed to have been below that figure as some sellers who quoted it have not obtained the orders. Ending of the strike at Jackson, O., furnaces has been accompanied by a revision upward of prices of bessemer ferrosilicon produced at these stacks. A basis of $59.50, furnace, for 10 per cent now is quoted by all makers in that district although none of them yet has resumed operations. It is understood some consumers have heavy stocks purchased during the closing months of the war and makers have substantial supplies on their yards against which shipping instructions are coming forward slowly.

Chain Prices Down

Pittsburgh, Dec. 9.—Prices of steel chain show marked firmness, due to the fact that makers are heavily sold up and are unable to secure supplies of merchant bars for early shipment except at substantial premiums over the old base price. Much business is piling up as production is interfered with through the scarcity of raw material and shipments naturally are falling behind the orders. Pound chain is unchanged on a base of 5.75c, Pittsburgh, for 1-inch proof coil and the recent advance in steel loading chain resulting from an adjustment in the wage scale for making this class is firmly maintained. The advance in this class of chain was 6 cents a pound in ¼-inch, 5½ cents in 5/16-inch, 4½ cents in ⅜-inch, 1 cent in 7/16-inch, 2½ cents in ½-inch, 2 cents in 9/16-inch and ½ cent in ⅝-inch.

Early Shapes Are Scarce

Fabricators Obliged to Draw on Warehouses—Awards Numerous But Not Heavy—Smelter For India is Placed

Pittsburgh, Dec. 9.—Shape mills in this district are falling behind in their deliveries against orders for structural shapes and because of this situation some of the fabricating interests have been obliged to draw upon warehouse stocks in the meeting of their obligations. Such purchases mean payment of $15 a ton over the mill base. The position of the mills as far as small shapes are concerned is even tighter than in the larger lines and delivery against current bookings are not being promised before the first of February, and even later. This condition in part is due to the fact that small shapes are rolled on bar mills and in the desire to reduce the backed-up tonnage of merchant bars, manufacturers are not devoting much capacity to the rolling of the smaller shapes. No trouble would be had in making sales of the latter for prompt delivery at substantially above the regular market base of 2.45c, Pittsburgh, but as a general rule this quotation is being generally observed.

New England Demand Steady

Boston, Dec. 8.—The demand for structural steel throughout New England, contrary to the usual tendency at this time of the year, is holding firm. Inquiry is strong for 1920 delivery and actual orders for prompt delivery continue to be placed in favorable numbers. The contracts awarded during the week, although in most cases small, included many buildings of steel construction. A storehouse let for construction in Boston will take 300 tons of steel. Warehouse supplies of structural shapes are holding up better than other grades.

India Smelter Takes Tonnage

New York, Dec. 8.—Although large tonnages are lacking, there is a fairly good sprinkling of orders in the eastern structural market. The largest contract of the week to be made tentatively called for 3500 tons for a zinc smelter at Janshedpur, India. A number of other fair sized awards were made. While new inquiry was light, there continues to be considerable tonnage pending, and fabricators are confident that the great bulk of this business will be placed. Another lot expected to be let most any day involves 800 tons for the Biltmore Country club, Rye, N. Y. Action on the Newtown high school in Brooklyn, requiring about 800 tons, has been postponed indefinitely. Owing to belated mill shipments, eastern fabricators are not accepting business for delivery much under three to four months. Were it not for the delay in getting material from the mills, the majority of eastern fabricating shops could handle orders in eight and nine weeks, it is asserted.

Orders Exceed Shipments

Philadelphia, Dec. 9.—Shape orders, while mostly small, form a steady stream and eastern mills are adding new tonnage faster than they can ship. Several important lots were placed the past week. A Japanese interest bought several thousand tons from an eastern mill and a Pittsburgh mill which is making a special drive for ships tonnage, took a big lot of ship shapes for Baltimore yard at 2.40c, Pittsburgh. The minimum figure at present with one eastern maker on new tonnage now is 2.75c, mill.

Most Tonnages Small

Chicago, Dec. 9.—Construction work in the west at present is confined to small tonnages, the largest project closed recently involving 660 tons for three buildings for the American Steel Foundries at Detroit. The Hotel Sherman Co. is inquiring for 600 tons for additional stories on its hotel at Chicago. The inquiry for 400 tons for a Y. M. C. A. building at Columbus, O., has been withdrawn, as has the inquiry for 200 tons for trusses for the Drake hotel at Chicago. Plain material continues unchanged at 2.72c, Chicago.

CONTRACTS AWARDED

Theater building, Baltimore, 1100 tons, to the Harris Structural Steel Co.

Zinc smelter at Janshedpur, India, 3500 tons, placed tentatively with United States Steel Products Co by Lawrence Addicks, consulting engineer, 6 Church street, New York City.

Building for Standard Guano Co., Baltimore, 800 tons, to the Shoemaker-Satterthwait Bridge Co.

Building for Hartford Times, Hartford, Conn., 260 tons, to Levering & Garrigues.

Plant addition for American Chain Co., York, Pa., 250 tons, to independent shop.

Building for Southern New England Telephone Co., Hartford, Conn., 300 tons, to the American Bridge Co.

Addition to Bush Terminal office building, New York, 650 tons, to the American Bridge Co.

Public school No. 43, New York City, 190 tons, to the Phoenix Bridge Co.

Plant addition for Stevens-Duryea Co., New York, 660 tons, to the Phoenix Bridge Co.

Factory buildings for Berlin Construction Co., Berlin, Conn., 1130 tons, to the Phoenix Bridge Co.

Extension to mill for Inland Steel Co., Chicago, 1200 tons to Worden-Allen Co.

Foundry and core-room addition for Janesville Machine Co., Janesville, Wis., 100 tons to Worden-Allen Co.

Extension to power house of the Goodyear Rubber Co., Akron, O., 400 tons to the McClintic-Marshall Co.

Factory building for the Gear Grinding & Machine Co., Hamtramck, Mich., 250 tons to the McClintic-Marshall Co.

Factory building on Waldon Ave., Buffalo, 250 tons to the Jones & Laughlin Steel Co.

Buildings A, B, and C at Detroit, for the American Steel Foundries, 600 tons, to Whitehead and Kales Co., Detroit.

Foundry building for the Buda Co., Harvey, Ill., 236 tons, to Worden-Allen Co.

Steel for waste heat boiler room at the plant, for the Marquette Cement Mfg. Co., La Salle, Ill., 126 tons, to Federal Bridge Co.

Addition to building for Albert Pick & Co., Chicago, 120 tons.

Sanitarium building, for the Daily News Fresh Air Fund, at Lincoln Park, Chicago, 115 tons, to American Bridge Co.

CONTRACTS PENDING

Biltmore Country club, Rye, N. Y., 800 tons, award expected soon. Geo. A. Fuller Co., general contractors.

Newton high school, Brooklyn, 800 tons, postponed indefinitely.

Additional stories on its hotel for the Sherman Hotel Co., Chicago, 600 tons, bids asked.

The Nonferrous Metals

	‡Copper	Future Straits N. Y.*	†Lead, New York basis	Zinc St. Louis basis	Aluminum	Spot antimony	Nickel ingot
Dec. 3	18.25	53.50	6.75	8.30	33.00	9.25	42.00
Dec. 4	18.25	53.75	6.75	8.30	33.00	9.25	42.00
Dec. 5	18.37½	53.75	6.75	18.32½	33.00	9.50	42.00
Dec. 8	18.37½	54.50	6.90	8.40	33.00	9.50	42.00
Dec. 9	18.55	54.50	6.90	8.40	33.00	9.50	42.00

*Future shipment from Singapore or London.
†American Smelting & Refining Co.'s price.
‡Open market.

NEW YORK, Dec. 9.—Higher prices for lead, zinc and tin have been recorded in the American markets the past week, due to advances abroad. Broad export inquiry has been reported, particularly for lead and zinc. Great Britain has been in the market for large tonnages of zinc, also lead; France for zinc and copper; Japan for zinc, lead and copper; Scandinavian countries for lead. Domestic demand, on the other hand, has been held back by the shortage of fuel. Some important consumers have been forced to close down, including many automobile plants. The American Sheet & Tin Plate Co., Gary plant, which consumes large tonnages of zinc and tin, is closed, and shutdown of some of the company's other works was threatened. The Chicago plant of the National Lead Co. was reported closed. The Anaconda Copper Mining Co. closed its Montana copper mines and smelter, and refinery and operations of its other Montana properties were threatened. Many other smelters and refiners have only small supplies of fuel and if the fuel shortage is protracted production will be much further protracted.

The copper market appears to have reached bottom at 18c, as a vastly improved demand has appeared since the market reached that level. Business was done in electrolytic copper for first quarter delivery the past week at 18c, but more recently consumers bid 18.25c, and today the market was 18.50c to 18.62½c. The producers seem to have determined to keep the reins of the market and have been trying to keep out the speculative element. Second hands have bid as high as 19.50c for copper for March delivery, when consumers were offered metal for that position at 18.25c. Casting copper is scarce at 18.12½c to 18.25c; lake is nominally quoted at 18.75c to 19c.

Prime western zinc advanced further under the leadership of the London market, despite falling exchange. Sales for export were aided by the London market. East St. Louis market advanced about 25 points from Dec. 1 to Dec. 8, to 8.40c, for prompt and first quarter shipment. High grade zinc was quoted 9c to 9.12½c, delivered, Dec. 8.

The American Smelting & Refining Co. advanced its lead price to 6.90c, New York; 6.65c, East St. Louis. Slightly higher prices prevail in the outside market. The American lead market is being forced upward against the judgment of the producers, by the rise abroad, due to curtailed world supplies.

The tin market, after declining to a low point of 53.25c last week, for Straits tin, spot New York, responded to a sharp rise in London and advanced to 54.50c to 55c on Monday, but today was 54.25c to 54.50c. The first named prices also applied to futures, which were steady today. Spot 99 per cent was available about half a cent below Straits. Demand has been light, owing to recent heavy deliveries and reluctance of consumers to buy ahead during the present coal shortage.

Antimony advanced a quarter cent to 9.50c for both spot and futures. Business was done at this price. Aluminum and nickel are steady.

Semifinished Is Higher

Scant Tonnage Open to Sale Makes Market Indefinite—Sheet Bars Bring $50—Slab Bids of $50 Declined

Pittsburgh, Dec. 9.—Not much trouble is experienced in the sale of either billets or sheet bars at substantial premiums over the March 21 quotations when any tonnages are available for the open market. This occurs, however, only occasionally and usually as a result of an uneven distribution of finishing mill activities. Small tonnages of 4 x 4 billets occasionally reach the market and have found ready sale from $43 to $45. While considerable tonnage still is moving to consumers at the old base of $38.50 on contract, such tonnages as are offered on the market bring $43 to $45 frequently enough to make this the quotable range. A sale of 1000 tons of sheet bars which became available because an original buyer could not use them, is noted at $50 and it is doubtful if other tonnage could be bought for less than $48. In fact, business has been done at both $48 and $50 recently and the current market on the small prompt tonnages available is quotable at these figures. It is reported that wire rods have gone as high as $65 on recent sales.

Billets and Slabs Higher

Philadelphia, Dec. 9.—More than 5000 rerolling billets were sold in this district the past week at $54, delivered, or $50, Pittsburgh, and some slab tonnage was sold by adding a differential of $2.50. More than 1000 tons of forging billets were sold at $60, Pittsburgh, or $64, delivered eastern Pennsylvania. There is inquiry for semifinished material for Europe but it does not appear active.

Higher Prices Are Paid

Youngstown, O., Dec. 9.—Semifinished material is scarce in this district and is becoming more so steadily. A tendency toward higher prices prevails. One lot of 1500 tons of slabs and another of 300 tons, brought $48, mill, last week. Sheet bars practically have disappeared from the market. If they could be had, it is believed a quotation of $48 would about represent the market. A recent inquiry put out by one valley consumer brought several quotations ranging from $47 to $51.

Offer $50 for Slabs

Cleveland, Dec. 9.—Producers of semifinished material in this district have been offered $50 for open-hearth slabs but have declined to accept the business because they are unable to offer any tonnage at present in view of their contract obligations. Semifinished material continues exceedingly scarce and various buyers who would take on tonnage are willing to pay higher prices.

Wants Strip Tonnage

Pittsburgh, Dec. 9.—Some makers of strip steel who opened their books for first quarter 1920 business, already are booked to capacity. Those who have not been taking new business have obligations accruing from the strike interruption to keep them engaged during the first three months of the year. Huge inquiries are pouring out for early tonnages, particularly of hot-rolled, while a Detroit automobile company is seeking to place approximately 100,000 tons of cold-rolled strip steel for delivery in equal monthly tonnages over the whole of next year. This steel is wanted for brake bands. Tendency of buyers to overbuy as a measure of protection against possible shortages next year has led some manufacturers to limit orders for the first quarter to the same tonnages placed by the individual buyer for the present quarter. Much business is being turned away by makers at present because of their lack of tonnages over and above contract obligations.

More Advances

In Cast Iron Pipe—Large Tonnages Are Pending in Chicago

New York, Dec. 8.—With pig iron advancing rapidly and private demand coming out in heavy volume, cast iron pipe in the East has gone up $4 a ton. Class B pipe 6-inch and over now is holding at $62.30, New York, and 4-inch at $65.30. Class A pipe is quoted $2 higher. An advance has been expected for several weeks. Owing to heavy private buying, deliveries on 6, 8 and 10-inch pipe can not be had before eight weeks, and at least in one or two instances before 12 weeks. Shipments on some of the larger sizes, such as 24-inch pipe, are scarcely available before a month. Bids have been closed on 2000 tons for New York City. John Fox & Co. were low bidders. Other than this there is little public demand.

Large Tonnage Pending

Chicago, Dec. 9.—Although bids were opened several days ago at Elyria, O., on 5000 to 7000 tons of cast iron pipe, no award has been made as those in authority have been unable to agree on their course. Bids will be opened Dec. 15 at Sandusky, O., on a small lot. Aside from these lots the market affords little prospect of business, aside from routine and contractors' orders which have been coming in sufficient volume to give shops good operations.

Pipe Mills Also Affected

Pittsburgh, Dec. 9.—The coal shortage is doing something which the strike of the steel plant workmen failed to do and that is to restrict appreciably the production of the National Tube Co. This company still has in operation all of its plants, except the Riverside works at Benwood, W. Va., which has been down since the first day of the steel strike, but coal supplies are so short that it has been necessary to restrict production to the lines in most urgent request and where the orders are heaviest in order to prolong the fuel and also plant operations. The production situation is getting bad in tubular goods, for the lack of coal is holding in check the operation of the Youngstown, O., plants, while Pittsburgh independent plants are going along at a reduced rate and in the Wheeling district all steel plants, it is believed now could be operated if coal were plenty. Marketwise the situation is as it has been for some time past, with big demands coming out for oil well and line pipe and business again backing up because of the inability of makers to bring production to a point in keeping with the requirements.

Another Advance in South

Birmingham, Ala., Dec. 9.—Demand for cast iron pipe continues strong in the South and some makers are withdrawing from the open market. Another advance in prices has been made, 4-inch now being quoted at $59 and the 6-inch and over at $56.

Jobbers Advance

Higher Prices Shown at Boston, Cleveland and New York

Boston, Dec. 8.—With climbing pig iron, coke, and scrap markets, and the continued difficulty in obtaining deliveries, warehousemen in Boston have made advances effective this week. Warehouse prices in most cities in New England have advanced at different times ever since the steel strike was called, but the larger Boston houses have, until the last few weeks, doggedly stuck to the old schedule. Recently this uniform schedule has been broken up and today it is hard to give the going market value of any one warehouse grade. One of the largest Boston interests this morning announced the following advanced schedule: Steel bars, 4.00c; iron bars, 4.10c; shapes, 4.00c; plates, 3.95c; No. 10 blue annealed sheets, 5.30c; No. 28 black sheets, 7.65c; No. 28 galvanized sheets, 9.00c; bands, 5.20c; hoops, 5.45c. The demand in all lines except plates continues unusually active.

Prices Show Range

New York, Dec. 8.—A wide range of prices characterizes the local warehouse market in sheets and steel bars. On the latter, one large interest is quoting 3.37c, New York, another 3.52c, and still others 3.62c. In sheets the divergence in prices is more marked. No. 10 blue annealed is quoted from 4.82c to 6.00c; No. 28 black sheets from 6.00c to 7.50c; and No. 28 galvanized sheets from 7.25c to 9.50c.

Some Cleveland Jobbers Advance

Cleveland, Dec. 10.—Flat increases of $5 a ton on all warehouse stocks of steel have been put into effect here by certain jobbers. This brings the quotations to 3.52c on steel bars, 3.62c on structural shape, 3.82c on plates, 4.72c on No. 10 blue annealed, 5.52c on No. 28 black and 6.87c on No. 28 galvanized sheets.

Material Shortage Slows Exports

Japan a Heavy Buyer of Tin Plate and Railway Material — Oriental Demand For Pipe is Larger—Delayed Deliveries are Diverting Inquiries to England — Chile Purchases 18,000 Tons of Rails

NEW YORK, Dec. 8.—Buying for export daily becomes more difficult. While considerable material has been sold during the past week the outlook is not bright. A number of the well established houses complain that they are finding it difficult to place orders with mills, not only because of labor deficiencies but also because of coal shortage. So long as this situation obtains the mills hesitate to book future business. The demand from abroad continues to be active, however, and some sales constantly are being made to the Orient and South America. This is a sellers' market exclusively and practically any material offered finds a ready taker at prices far above the former schedule.

The big agencies are attempting to keep prices down, and they have informed purchasers that the 1919 schedule is going to prevail during 1920. But when an effort is made to buy from them they declare they have no material to quote on. This has thrown the market into the hands of the independent and the small producers, the warehousemen and the jobbers who are less considerate about the price level. Japan, the largest buyer today, is beginning to show a hesitancy in placing contracts.

This desire of the Japanese to have steel shipped before March 1, 1920, is believed to be prompted by the fact that they are convinced freight rates in this country will be advanced at that time and such a change materially would raise the price of the material delivered. Furthermore, it was explained by one Japanese purchaser, if material is to be contracted for on the basis of future delivery they may as well place their requirements with England. Taking into consideration the rate of exchange, supplies can be purchased in England at prices approximately those prevailing here. The chief drawback to buying from England heretofore has been the long delay in deliveries.

Unprecedented Tin Demand

One of the recent Japanese inquiries was for 10,000 boxes of tin plate. The Japanese expressed a willingness to pay $8.50 c.i.f. but the quotation was far beyond this. One American jobber offered to fill the order at approximately $10 c.i.f. The offer was refused. One house reported it has sold Japan within the past week or so a total of 21,500 boxes of tin plate. The sales ranged from 1000 to 5000 boxes each. The price on this business varied from $7.50 to $7.60 per base box, Pittsburgh. The Japanese have been taking all the tin plate they could find. It was estimated by one exporter that the Japanese inquiries for tin plate today total 40,000 boxes.

There has also been an extremely active demand from Japan for bessemer black plates for tinning. The specifications named on most of the inquiries are 30 Birmingham gage, 36 x 72 inches. It is practically impossible to obtain the material. According to well authenticated reports the United States Seel Corp. refused to consider an inquiry for 20,000 tons. The failure to place any of this business is not due to high prices but more particularly to the inability to find a mill which is willing to sell or to accept a contract for reasonable future delivery.

A number of small sales of other material to Japan have been reported. A new export house has just closed for 1700 tons of bars. A Japanese order for 3000 kegs of nails also was taken at an advanced price. A new inquiry is out for 7000 tons of plates and sections for shipbuilding. Japan also inquired for 300 tons of light rails, and was quoted an advance of $7. The quotation was rejected. Japan has been buying heavily for the Manchurian lines. A sale of 800 freight cars of 60,000 pounds capacity to Manchuria is in prospect.

The trade of China is somewhat different from that of Japan. China depends upon silver to make her balances and the only large nation of the world having a fair stock of silver is the United States. As a consequence American companies have been able to initiate avenues of trade by purchasing Chinese goods and paying cash therefor. The English trading houses, nevertheless, have branches all over China and they are holding on strongly. Among the Chinese sales during the past week were 600 tons of mild steel plates at 2.75c, Pittsburgh base. This sale was made through a British agency. The current Oriental purchases consist of pipe, bars, sheets and galvanized goods. One of the largest inquiries calls for 6,000,000 feet of pipe for deliveries to start in April and extend over 15 months.

India purchased 800 feet of pipe at a price said to be 43 per cent under the English list. Australia took 400 tons of mild steel plates at 2.75c Pittsburgh. A small Australian order for bars was also placed at 3.20c f.a.s. Canadian mills are reported to be pushing the American producers close for some of this business.

A number of American builders have closed for some 20 marine engine units to be shipped to Manila. The deal was handled for the Yangco Shipbuilding Co. of the Philippines by Ambrosia Magsagsay, general manager for the company, which proposes to go into ship construction at Manila on a big scale.

Some of the American export business would not have been placed had it not been for the offices of certain British houses which are making every effort to hold their customers in world markets. An American mill has contracted to deliver to England 4500 tons of sheet bars. England also has purchased 8000 tons of billets. One house reported that it had sold England between 15,000 and 20,000 tons of plates during the past 30 days. The price was equal to the domestic. It is learned a very large English order for pig iron is pending.

Rail Sales Are Features

Resumption of production in Belgium apparently increases the wants of that country. Investigators report an insistent and growing demand for materials for lining the pits of coal mines, as well as cables, beams, and machinery of all sorts, also high resistance galvanized steel wire for cable manufacture.

It was reported last week that the Submarine Boat Corp. has sold to Italy four "unassembled" ships.

South American business largely comes in dribbles. The United States Steel Products Co., is reported, however, to have accepted an order from Chile for 12,000 tons of rails. A minor house sold Chile 6000 tons of rails.

Advance Steel Prices in Britain

Increases Affect Semifinished Material and Small Finished Products — Molders Strike Continues 100,000 Being Idle—Steelmakers' Stocks of Steel Mount to New Record Because of Car Shortage

Weekly Iron Trade Review Staff Cable

European Headquarters,
THE IRON TRADE REVIEW,
10 Regent St., S. W. 1.,
London, Dec. 8.

PRICE increases feature the British iron and steel market. This especially applies to semifinished material and to small finished iron and steel products. Iron skelp has been advanced to 24s, steel skelp to £25 10s, and hoops to £25 10s. Billets and sheet bars are up from 5 to 10 shillings. Middleboro No. 3 is higher. Puddling rates have been advanced 7½ per cent and other iron works averages 5 per cent. The supply of coal has improved but still is below the normal rate. The November output will approximate 19,000,000 tons. Railroad car shortage remains the big factor. Stocks of steel at Middleboro works have reached large proportions and in fact are the greatest ever known.

The demand for pig iron is excellent. A few furnaces which have been idle are resuming.

The idleness of many plants caused by the molders' strike may terminate next week. Negotiations which were scheduled for last week failed because the men still are unwilling to accept arbitration, proposing an increase of 5 shillings per week. In the meantime the stoppage of plant operations has reached an alarming stage. Manufacturers of automobiles, machinery, locomotives, marine engines, cast rolls and rolling mill machinery are especially hard hit. Many plants are being forced to close. The total unemployment is now well over 100,000.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 21.

Rate of Exchange—4.01½

KEEN buying, which is typical of the last two months of the year, is now in full swing. Pig iron prices are firm, and would be increased but the for the safeguarding clause which commits the buyer to responsibility for any addition to railway rates. This clause is insisted upon, whether for raw or finished material. The state of suspense covers not only railway rates, which most people expect will be put up 50 per cent, but also includes coal which should be reduced if ministers carry out their promises. The iron and steel trades are so strongly interested in both matters that it is hoped that both changes will be declared at once. When the declarations are made, it will be possible to rearrange prices generally.

It is quite possible that the iron trade will fail to get under the coal reduction any real compensating advantage for the sacrifices it must make under the head of railway rates. Coke makers are much dissatisfied with their prices, although they have reached unprecedented heights. The makers of the best coke, in particular, are very bitter because, under the cast iron system of coal control, they are unable to charge more than the makers of fuel admittedly inferior. Then, since the prices were fixed various additions to the cost of production have been made under the head of labor and materials. The coke makers hope to satisfy the coal controller that no equivalent reduction in coke ought to take place if and when coal is reduced.

The great scarcity of basic material may lead to the resumption of imports from America if sources of supply can be found.

The production of pig iron generally is insufficient, but the principal difficulty is with foundry and best iron generally, so many circumstances are keeping down the quality. The effect of this is some little shading of prices of forge iron in Cleveland, where supplies are fairly plentiful. The Cleveland market suffers very severely in its foreign business from exchange difficulties, which restrict buying by Italy, Belgium and France to the barest necessities. Enormous difficulties arise from the insufficiency of transport. Railway wagons are unobtainable and the molders' strike has placed a great obstacle in the way of engine repairs, and may eventually cause extensive stoppages on certain sections. Output is restricted enormously by the combined effect of wagon and coal shortages. Although the molders' strike continues, iron foundries are buying keenly. The only cheerful feature of the iron molders' strike is that the workmen are seeking to reopen negotiations. This is an entirely new attitude, indicating that the men are feeling the pinch. On the other hand, the Scotch iron molders are proposing to strike tomorrow, and this will greatly aggravate the position as some English mills have been renewed and repaired with castings obtained in Scotland.

Owing to the comparatively low production of steel, the conditions of west coast hematite, and to some extent the east coast, is much less serious. Everything points to a huge demand for pig iron when the iron molders' strike is settled.

Demand is strengthening in all departments of iron and steel. The activity in the finished iron trade is very great. There is not an ironmaster in South Staffordshire who has not within the past week or two, re-

Current British Prices

In Pounds, Shillings, Pence

	Home consumption	Export prices
SEMIFINISHED STEEL		
Billets, soft steel	16:10:0	16:10:0*
Sheet bars	14:0:0 to 15:0:0	15:0:0*
FINISHED STEEL		
Steel bars, England, ⅝ to 3 inch	20:0:0	20:0:0*
Ship plates, England	21:0:0	21:0:0*
Ship plates, Scotland	21:0:0	21:0:0*
Beams, England	18:0:0	18:0:0*
Beams, Scotland	18:5:0	18:5:0*
Sheets, black, 24 gage	28:0:0	28:0:0*
Sheets, galvanized, 24 gage	38:0:0	38:0:0*
Rails, 60 lbs. and over	16:10:0	16:10:0*
Tinplate, base box, 108 lbs.	2:06:0	2:06:0*

*Export steel prices are nominal.

PIG IRON		
Hematite, East Coast Mixed Numbers	10:0:0	10:5:0
Hematite, Scotch	10:10:0	10:15:0
Middlesborough Basic	8:5:0	8:10:0
Middlesborough No. 3	8:0:0	8:5:0
No. 3 Foundry, Derby, Leicester, Nottingham	9:5:0	9:10:0
No. 3 Foundry, Northamptonshire	8:08:0	8:13:0
No. 3 Foundry, Staffordshire	9:00:0	9:5:0
Scotch Foundry	9:15:0	10:0:0
Ferromanganese, 80 per cent	25:0:0	23:0:0
COKE		
Midlands furnace	2:10:6	.....
Midlands foundry	3:6:0	.....

fused orders, chiefly foreign, running into thousands of tons. These cover all branches, sheets, bars, hoops, material for reinforced concrete and sections. The mills are quite unable to cope with them, but there are very good reasons why they show a decided preference for home business.

Transport difficulties are so serious that many mills in the Black country, whose order books are loaded up, have their warehouses so full of finished material that a stoppage is inevitable in some cases until the mills are clear.

The scarcity of half-finished steel approaches famine proportions. Several mills near Birmingham are idle, or nearly so. One of the largest has not operated at more than 30 per cent of its capacity for two months. The country has been scoured for billets with very little success. A few Scotch parcels have been had at high prices. Welsh material cannot be delivered before January or February when the Ebbw Vale works, the Dowlais steel works, and others, resume full production. American steel does not now come in in sufficient quantity to produce an appreciable effect. Some fairly good lots of American discard steel have been offered at low prices, but these have a very limited use for ordinary trade purposes.

Galvanized sheets are ordered in big lots, and very strong efforts are being made in Birmingham to start additional mills which, for months past, have been waiting for the requisite skilled labor. Sheets sell easily at £37 ($148.55) to £37 10s ($151.89) per ton.

Billets have been advanced from £15 5s ($61.22) to £16 (64.24) per ton, but are almost unobtainable at this price. Finished steel has not been formally advanced but easily realizes from 10s ($2.01) to £1 ($4.01) more per ton.

War Control of Coke Prices Restored

WASHINGTON, Dec. 9.—An order of Fuel Administrator Garfield last Saturday restoring war time prices of beehive and by-product coke made sharp reductions in the prevailing market quotations. While not entirely unexpected, the order canceling the suspension order of last January was somewhat of a surprise in that no inkling of its coming was to be had until it was announced at midnight Saturday. It terminated a week, however, given over to final study of the coke situation, the few days previous having seen an order promulgated curtailing the output of beehive coke 25 per cent, which, at the average rate of production in the past few weeks, amounts to considerably more than the mere percentage shows.

By the order of Saturday night beehive coke prices were restored to these levels: Connellsville, furnace, $6; Connellsville, foundry, $7; Connellsville, crushed, $7.30; and on by-product: Furnace, $5.70; foundry, $6.70; crushed and screened, $6.20. This restoration largely was made by the fuel administrator in order to keep prices to the public, not only of coke but of stel and other commodities, from going higher. This is an avowed policy of Fuel Administrator Garfield and one which the political administration is backing. According to reports reaching here it is generally accepted with open arms by the public.

In this connection the geological survey's weekly report, which show the coke output of the week ending Nov. 29 was 449,000 tons, the highest in any week since last February, except just before the beginning of the steel strike, has the following to say on coke production and prices:

"The causes underlying the exceptional output of coke have been apparent since the beginning of the coal strike. The beehive ovens for the most part lie in the regions not affected by the strike order. Open top car equipment has been released in abundance by the closing of the union mines. The competition of by-product coke has been for the time being restrained by the difficulty which by-product operators have experienced in obtaining supplies of coal. The fact that war time maximum prices have been restored on coal but not on coke (Editor's note: At time this statement was issued coke prices were not fixed) has encouraged operators to dispose of their product as coke rather than as coal. The consequence of these tendencies is seen in the increased proportion of the coal produced going into the manufacture of beehive coke. Whereas normally the beehive ovens take 6 per cent of the output, during the last week of November they absorbed 12.3 per cent of all the soft coal produced."

The Garfield order restoring war time prices and regulations on coke was as follows:

"The United States fuel administrator, acting under authority of an executive order of the President of the United States, dated Aug. 25, 1917, and of subsequent executive orders, and in furtherance of the purpose of said orders, and of the act of congress therein referred to and approved Aug. 10, 1917,

"Hereby orders and directs that the order of said administrator, dated Jan. 31, 1919, suspending the operation of certain rules, regulations, orders and proclamations theretofore promulgated by or under the authority of the President of the United States or by said administrator relating to coal and coke be and the same hereby is revoked insofar as said order suspends the orders and regulations of said administrator fixing or regulating the prices of beehive and by-product coke, or fixing or regulating the margins or commissions of middlemen or wholesale or retail dealers in beehive and by-product coke, and said orders and regulations are hereby restored to like effect as if the same had not been suspended, and said administrator

"Further orders and directs that all beehive and by-product coke in transit on or after date of this order shall be subject to diversion in like manner and to the same extent as bituminous coal under orders of said administrator relating to the diversion of bituminous coal in effect at the date of this order. The person or consumer to whom any such coke is diverted shall become liable as of the time of such diversion to pay to the shipper thereof the prices for such coke as fixed by or under the authority of the President of the United States and in effect at the date of such diversion, plus transportation charges thereon, and the order of said administrator dated Jan. 14, 1918, as amended by the order of said administrator dated Nov. 20, 1918, is hereby suspended insofar as said amended order is inconsistent with this order, and said administrator

"Hereby authorizes and empowers the director general of railroads and his representatives acting by and under his authority to make such diversion of coke in transit as may be necesary in the present emergency."

Wants Equipment

Friction clutches, one-way marine clutches, metal adjustable shaftlogs and propeller wheels for motor boats, will be manufactured by the E. J. List Mfg. Co., Havana, Ill., which was recently incorporated. The company does not plan to build a new plant, but is erecting an addition to its present building, and is in the market for screw lathes, drilling machines and grinding machines. The company, which is capitalized at $35,000, was incorporated by E. J. List, president; L. B. Travers, vice president; Fred C. Euteneuer, secretary-treasurer, and the office of the company is located on Water street, between Main and Adams streets, Havana, Ill.

Shells Require Uniform Castings

High-explosive Shellmaking Demands Consistent Ingots if the Percentage of Discards is to be Held to a Minimum—Forming Process Executed by Horizontal Hydraulic Press—Method Followed at Watertown Arsenal

BY HERBERT R. SIMONDS

PERHAPS the greatest necessity for uniform castings is found in the manufacture of high-explosive shells. Here are found many of the principal problems met by foundrymen, metallurgists and machinists. A detailed account of this manufacturing process is beyond the scope of this article but a general description of the methods employed at the Watertown arsenal, Watertown, Mass., in the production of 14-inch, high-explosive shells may serve to illustrate the attention which generally is given to uniform castings in shell manufacture.

The arsenal plant was established in 1816 and seven of the original buildings are still in use so that the entire progress of the metal working trade of this country is written on the annals and records of the institution. New buildings and modern equipment have kept the plant continually abreast of the times.

Ingots Carefully Designed

Ingots of the size required for 14-inch shells must be designed carefully to prevent the formation of cracks and pipes. The ingots used at the Watertown arsenal are corrugated and tapered along carefully predetermined lines to facilitate cooling and withdrawal from the mold. They are cast of special steel and their structure and analysis must meet the strict requirements of the foundry inspector. Each ingot as cast weighs 2800 pounds, which includes a 500-pound riser or hot top connected to the main ingot

FIG. 2—INGOTS ARE CAST WITH A 500-POUND RISER WHICH IS KNOCKED OFF PRIOR TO FORGING

by a bottle neck. Until recently these ingots were cast in one straight section, the riser being merely a uniform continuation of the ingot itself. The risers were then sawed off by a slow and costly process. The ingots, which now are molded with the bottle-neck joint between the riser and the ingot body, are placed on a two-point support. A weight is dropped on the joint, and breaks off the riser at one blow. This not only saves time and expense but presents a fracture across the top of the ingot for determining the structure of the metal.

Serial Number is Important

Before each ingot is cast a strip of metal, which is stamped with a number, is partially inserted into the mold. This number follows the ingot through the various operations and becomes the number of the completed shell.

Considerable importance is attached to this individual numbering of shells, and if for any reason a shell number is lost in its circuit through the different finishing processes, the shell is discarded, even though nearly completed. The number is painted in white figures on the side of the ingot, and later is die punched on the partially-finished shell. Thirty of the ingots are cast from one heat and these become a unit group in the shell production. Each group continues intact on the records and throughout all the operations until the shells are boxed for shipment. In fact the group significance does not disappear until the shells have been fired and the results noted. A careful chemical analysis of specimens taken from

FIG. 1—HYDRAULIC PRESS, WHICH IS BUILT TO EXERT A TOTAL FORCE OF 2000 TONS, TRANSFORMS SOLID STEEL INGOTS INTO HOLLOW CYLINDRICAL SHELL FORMS IN ONE OPERATION

FIG. 3—A HOT FORGED INGOT AFTER IT HAS BEEN PRESSED AND EJECTED FROM THE PRESS CONTAINER. THE MANDREL IS SHOWN AT THE LEFT WHERE IT HAS BEEN WITHDRAWN THROUGH THE COOLING COIL

each heat in the foundry indicates the composition of the shells in each group, and this analysis therefore is an important part of the records of the shells as they pass from one department to another. The heat treating is based upon this composition, and the record and behavior of the completed shells is compared with the record of chemical analyses. In this way determination for future foundry practice is developed.

From the yards where they are stored after the risers have been taken off, the ingots are taken to preheating furnaces; then to forging furnaces, where the correct forging heat is obtained; and, finally to a large hydraulic forging press. This press is the most spectacular piece of apparatus in connection with the manufacture of the shells. By its use the solid hectagonal ingot is transformed into a hollowed cylinder. The ingot at a temperature of 1296 degrees Cent. is placed in a container and a piercing mandrel or punch, placed against one end, is forced slowly 44 inches into the red-hot metal. The initial action under this forging operation is that of compressing the ingot. As the mandrel starts its slow movement in the end of the ingot, the hot metal completely fills the container.

As the progress of the punch con-

FIG. 4—AN 80-TON CAR BOTTOM FURNACE IS USED FOR ANNEALING THE SHELLS AFTER FORGING. THE ANNEALING PROCESS REMOVES ANY STRAINS DUE TO FORGING AND GIVES THE STEEL FREE MACHINING QUALITIES

tinues the metal flows back along the shaft of the mandrel and compensates for the metal which is forced out of the central cavity. The punch, when withdrawn from the newly-formed shell, recedes through a spraying coil, which by a constant play of cold water, drives the heat forward and off the punch end. This punch end or nozzle, as it is called, is a separate piece screwed on to the steel shaft of the punch proper, and is made of chilled cast iron this having been found to stand up under the scoring action of hot metal better than steel. The shell is forced out of its container by a hydraulic press and is then taken by a crane to storage piles where the numbers, which have been effaced during the forging, are stamped on by dies while the metal is still red.

Shell Order Preserved

The order of taking the ingots from the forging furnace and the forging press follows a definite, carefully worked out system, so that a shell number would be known even if the lettering could not be read. The shells whose numbers have been stamped are taken from the stock piles and placed on an 80-ton car bottom furnace, shown in Fig. 4. After annealing, the open end of the shell is cut off to length, and the shell is centered for turning. In order to confine the boring operation to a minimum, the shells are centered with respect to the internal cavity, rather than to the outside dimensions. To accomplish this each shell is lowered over circular revolving guides.

The upper guide fits into the tapered portion at the base end of the cavity and thus centers that end. The lower guide is made in the form of a frustrum of a cone with its base larger than the cavity opening, and therefore as the shell is lowered onto this frustrum guide the open end also becomes definitely centered. The position of the shell on the centering device is shown in Fig. 5. The guides are of the ball-bearing type so that the shell when resting on them is easily revolved. An outside centering point is brought down from above, and in this way locates a point on the outside of the top of the shell, which is on the axis of the shell cavity.

In the next operation the shell is rough-turned and the base end is partially cut off. This partial cut is shown in the standing shell in Fig. 7 and the reason the cutting-off operation is not carried to completion, is that the slot formed by partial cutting provides an excellent means for holding and withdrawing the shell during the nosing operation. After this the cavity is bored in the large boring lathe shown in Fig. 8. This is the final operation on the interior of the shell and it leaves the lines of the cavity in the body of the shell accurately conforming to the required dimensions.

Forge is Used for Nosing

Forming the nose of the shell, or ogive, as it is technically called, is perhaps the most interesting stage of the forming operation. The method of

FIG. 5—SHELLS ARE CENTERED FOR THE BORING OPERATION BY PLACING THEM ON AN UPRIGHT BALL BEARING SUPPORT

nosing the shells is merely a development of the ordinary steam-hammer forging process. The shells are placed in groups of six on a supporting frame directly in front of a small furnace, which is provided with circular openings corresponding to the positions of the six shells. The shells are carried forward until they project part way into the furnace openings. The heat is applied to the ogives of the shells only and as the walls of this portion are thin, it requires but 20 minutes to bring them up to the forging temperature which, in this case, is 1230 degrees Cent.

The shells are taken one at a time from this furnace by small traveling chain blocks and are placed in a Whelan-type nosing attachment, as shown in Fig. 7. This attachment is independent of the nosing press and consists essentially of a carriage, supporting a revolving universal chuck. The chuck, which is motor driven, automatically centers itself on the body of the shell. The shell thus fastened in the chuck is free to revolve, together with the chuck, on its axis. The carriage is provided with a friction drive and may be moved up to or away from the press.

Naturally the ogive of the shell, which heats rapidly, also cools off rapidly, and, therefore, it is important that the handling of the shell from the furnace to its position in the nosing attachment and through the nosing operation itself, be accomplished with a minimum delay. As soon as the shell is placed in the universal chuck the latter grips the shell at a predetermined pressure which, when reached, automatically shuts off the driving motor. A revolving motion is then given to the shell, and at the same time it is carried forward into the nosing press. The latter operates at 200 strokes per minute, and the shell is forced in and revolved as fast as the press will take it.

Feed is Automatic

Both the revolving motion and forward movement of the shell ahead are controlled by friction, so that, in case the press does not take the shell as fast as its forward motion requires, the friction clutch slips and eases up the travel. The hot shell, before it is run into the nosing press, is shown in the chuck in Fig. 7. A shell, which has just been taken out of the press, is shown standing at the left. The nosing operation draws the ogives down from an interior diameter dimension of 11.17 inches to an internal diameter at the extreme end of 3.75 inches and at the same time leaving the inside surface smooth. The shells then are transferred from the nosing press to the machine shop where the nose ends are faced. A small straight section is bored 3 inches long at the nose end and rough threaded. A temporary plug then is screwed into this threaded section in order to exclude water during heat treatment.

The details of the heat treatment for each group of 30 shells are determined from the records of their chemical analysis made at the foundry. The shells are quenched in water instead of oil and the temporary cap in the end of the shell is necessary because the water which otherwise would enter the shell would cause uneven cooling on the inner

surfaces. After the heat treatment one shell, selected at random, is cut up for test purposes. If the tests are satisfactory, the remaining 29 shells are accepted up to this point of the construction. If the tests are unfavorable the entire lot is reheat-treated or perhaps rejected entirely. From this point on the shells pass through successive operations in the machine shop until they are ready for the final hydraulic-pressure test. The operations in sequence are: Finish cutting the thread in the nose, which previously had been rough cut, finish cutting the boat tail or base end, facing the base end to exact weight, cutting the base-cover groove, and cutting the band seat. At this point the hydraulic-pressure test is made, through minute defects in the base metal. While these defects were not detected under any of the rigid tests, they were sufficient to let pass small amounts of the highly-compressed gas and thus to explode the inner charge and wreck the gun. This danger has been overcome entirely by using a base plate which consists of a lead disk covered with a thin copper plate. Such a combination seems to furnish just the resistance necessary to protect the steel shell.

Band Seat is Waved

It has been found necessary to roughen the band seat so that the copper band will not turn with the shell, as the rifling action takes effect. The easiest way to roughen the seat is to make wavy

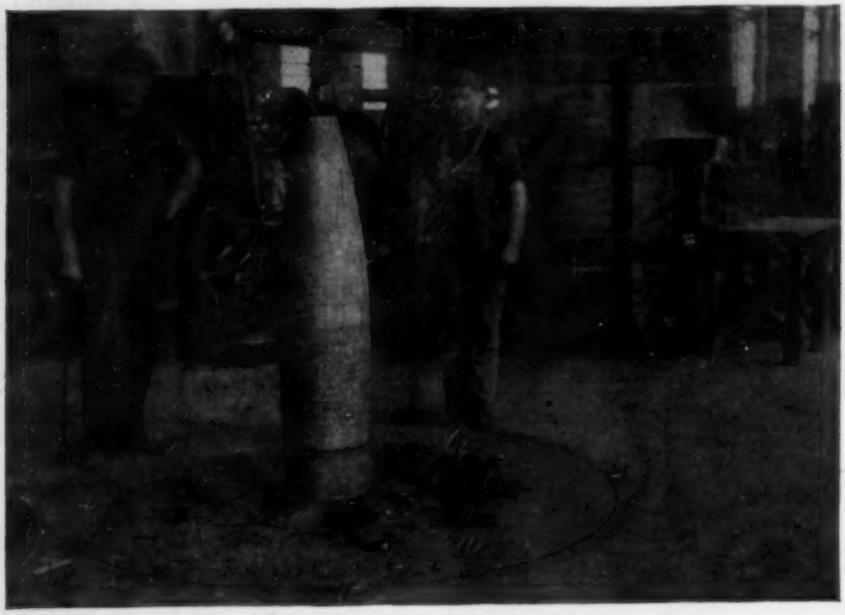


FIG. 6—WHEN THE BAND SEAT HAS BEEN CUT AND GROOVED THE COPPER BAND IS PRESSED ON BY A HYDRAULIC PRESS BUILT LEVEL WITH THE FLOOR

and afterwards the operations to complete the shells include finish turning the band, washing in hot soda water, painting the interior with a spray gun, assembling the base cover, painting the exterior, and crating for shipment.

Weight Must be Accurate

The operation of cutting or facing the base end to exact weight is interesting. A curve showing the total weight of the shell at $\frac{1}{64}$-inch intervals is used. In other words, the different weights of the shell, assuming it were cut off at any one of a series of points $\frac{1}{64}$-inch apart, taken from the base end furnish a means for determining the exact point of cutting, in order to give the finished shell the correct final weight.

It was found in using high-explosive steel shells in guns that the powder pressure in firing sometimes was great enough to enter the chamber shell cuts, such as are shown in Fig. 6. The cutting operation is shown in Fig. 10. A turret lathe is used. The first cut leaves small collars or projections about $\frac{1}{4}$-inch wide and $\frac{1}{4}$-inch apart surrounding the groove. The part between these collars already is machined to the finished dimensions leaving the top surface of the collars to form the top surface of the finished wavy projection.

The wave is produced by using a V-shaped tool with the opening towards the work. If this tool were held stationary on a collar throughout the cut it would turn the collar into a straight sharp edged projection without any waving or irregularity. The turret attachment, however, is given a positive oscillating motion with respect to the motion of the lathe itself. By this means the sharp edge of the resulting projection moves regularly back and forth across the top surface of the collar to produce the continuous wave shown in Fig. 6.

When the grooves have been cut and the shell is ready for the band, it is swung by a crane out over the banding press. A hot band is placed in the press at the floor line, as shown, and the shell is lowered through it. The 10-segment press then firmly seats the copper on to the waved recess. Near this press is a band ring heating oven where the copper bands are brought to a cherry red temperature. A detail of interest in connection with this furnace is the design of the doors. In opening a standard hinge door for the purpose of inserting or removing the rings it was found that an appreciable amount of the heat in the furnace was lost.

To save time and heat a curtain, consisting of a double row of short lengths of chain, was hung in front of the furnace opening. This has been found exceedingly efficient inasmuch as little heat is dissipated through the curtain as it normally hangs. It is only necessary to catch hold of a band with a pair of tongs and to draw it out through the curtain. The bands are made of such size that when heated they will slip over the outside dimensions of the shell.

Punch Die Removes Hot Metal

The large hydraulic-forging press is considered the most important link in the equipment for manufacturing 14-inch shells. The press has a pressure of 4000 pounds per square inch and a rate of travel of 44 inches in two minutes. It was built by Henry Berry & Co., Leeds, England, to exerting a total force of 2000 tons. The ingots are brought to this press at a temperature of 1296 degrees Cent. The machine is designed to take one ingot at a time and the rapidity of operation from the standpoint of the press is limited by the heat developed in the punch.

Each ingot as it comes to the press is placed in a heavy cast-iron cylindrical frame which is fitted with a replaceable cast-iron liner or interior section. The purpose of the latter is to give the proper diameter to the forgings. Steel bands are shrunk onto these cast-iron liners for greater strength against bursting. A shell is pushed to the back of the container by the first stroke of the plunger and then is pressed to a depth of approximately 40 inches with the second stroke. During the early operation it was thought necessary to upset the ingot in the press container before pressing so as to force the hot metal to completely fill the die. It was soon discovered, however, that this second operation could be done away with. The pressing causes the metal to flow not only to every corner of the die but back along the spindle of the mandrel itself to provide for this space taken

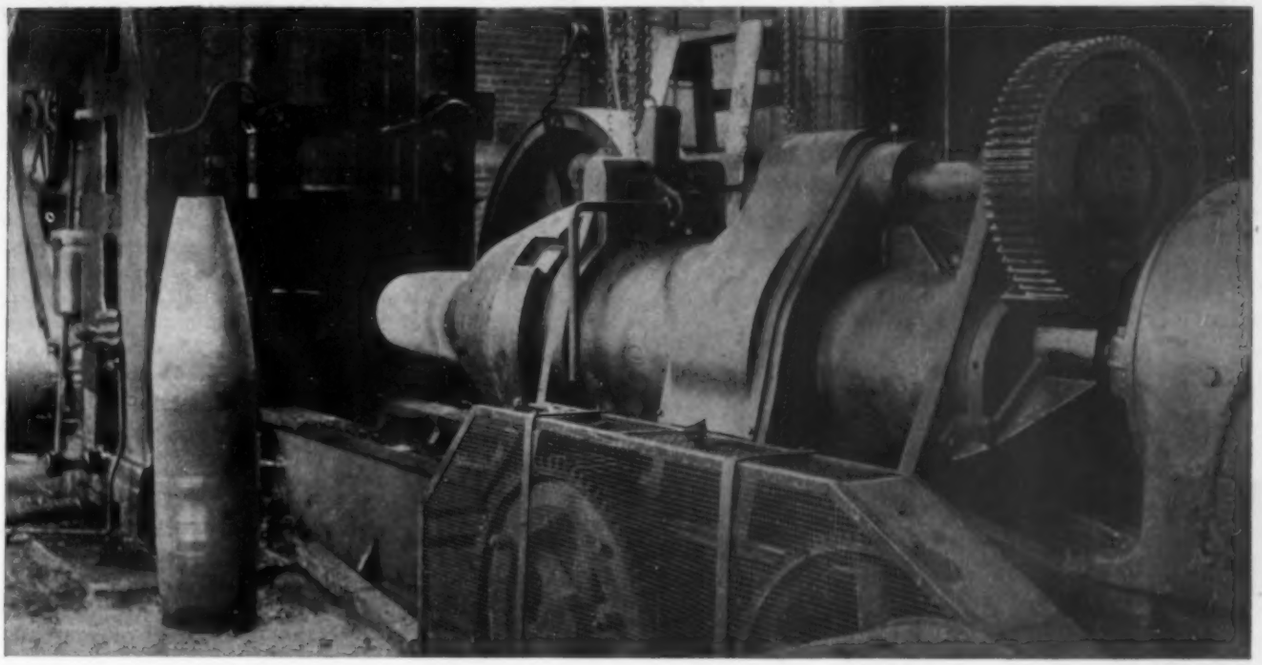


FIG. 7—AFTER THE BORING OPERATION IS COMPLETED THE SHELLS ARE HEATED AND TAPERED IN A NOSING HAMMER WHICH OPERATES AT 200 STROKES PER MINUTE

up by the mandrel, as it moves forward. After the mandrel is withdrawn from the completed forging, an auxiliary press is operated to eject the forging from the press container. Fig. 3 shows the forging just after it has been ejected from the container. It lies on a part of a heavy casting which forms the press end of the large machine. The mandrel has just been drawn back through the coil of pipe and has been cooled by the jets of water which play upon it from the inside of the coil.

A peculiar detail noticed in connection with the forging operation is that the nozzle or end piece of the mandrel must not be too hot nor too cold, previous to its being forced into the hot ingot. The first difficulty encountered in attempting to increase the speed of the press was that of cooling this nozzle. It was found by running one ingot after another through the press the nozzle became so hot that it scored badly and finally could not be used. The method of cooling at that time was by means of a short hose held in a man's hand. The cooling effect came constantly upon the end of the nozzle and much of the heat was driven back into the heavy part of the mandrel. In the attempt to cool the nozzle more quickly, the coil shown in the illustration was devised. This worked so successfully that the nozzle became too cool for best results.

FIG. 8—SHELLS PLACED IN A HEAVY CAST IRON CHUCK ARE BORED ACCURATELY WITH A MULTIPLE POINT TOOL WHICH GIVES THE EXACT OUTLINE IN ONE OPERATION

FIG. 9—AFTER THE SHELLS HAVE BEEN TAPERED BY THE NOSING HAMMER THEY ARE MACHINED ON LATHES

It was then necessary to decrease the amount of water used.

When for any reason the nozzle becomes cold, it must be partially heated before starting the punching. In practice, therefore, it is necessary to strike a balance between the amount of cooling water used and the interval from one operation to the next. The full capacity of the press has never been reached, and probably never will be, in the present plant, on account of the limit in furnace capacity and the lack of necessity. The furnace capacity until recently was entirely inadequate to economical production from the labor standpoint.

The 16 ingots which could be heated at one time were easily forged and handled in about half of the day's shift. And yet the number of men could not be cut down on account of the requirements of the work. In bringing the ingots up to the forging temperature of 1296 degrees Cent. it is necessary to conform to certain requirements as to heating speed. The ingots must be allowed to soak and the best practice developed after considerable experience is to heat the ingots through a period of seven hours up to the desired temperature and to allow them to soak for four hours at that temperature before using them in the press. This means that the furnaces are occupied 11 hours with one set of 16 shells.

As each shell is taken out for forging, another shell can be put in its place and in this way if it takes three hours to do the forging, the first shell will have a three-hour start on the heating process. However, this does not help much in reducing the loss of time of the men. Several unused heat-treating furnaces near at hand were brought into service. Their temperature limit was about 1000 degrees Cent. however, and thus their use was limited to preheating.

The capacity of the heat-treating furnaces was several times that of the forging furnace. The scheme, eventually evolved and which is now used, was to slowly preheat the ingots in the heat-treating furnaces up to a temperature of 1000 degrees, and then to transfer these ingots to the forging furnaces in order to get the last 300 degrees necessary to bring them up to the forging temperature. This has been highly successful and the production of the plant through this and other changes has increased from 16 to 45 shells per day without addition of a single man.

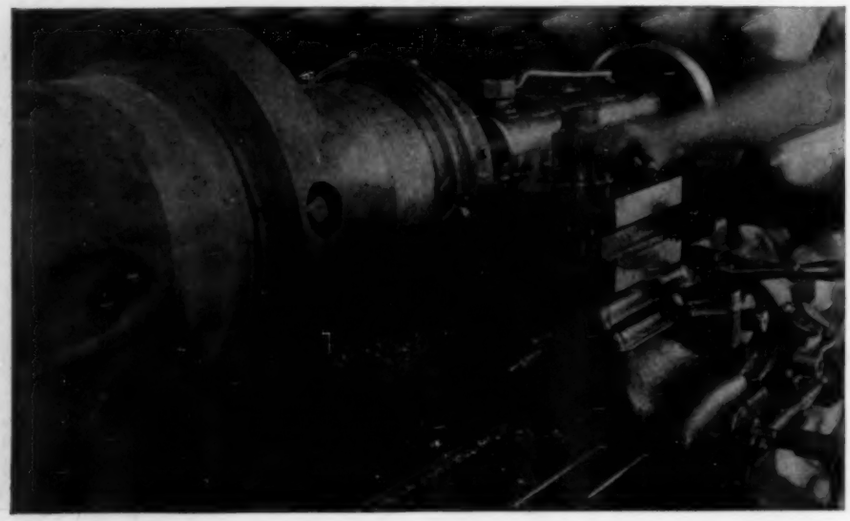


FIG. 10—WAVY GROOVES ARE CUT ON A TURRET LATHE EQUIPPED WITH AN ATTACHMENT WHICH OSCILLATES WHILE CUTTING

Germany Prospecting For Mineral Wealth

Various reports have been heard concerning discoveries of iron ore in the Hunsruck region of Germany, but not even in Germany itself are they considered seriously. Professor Beyschlag, of the German geological bureau, is quoted as saying:

"The deposits are found in the calcaire strata, the ore being classed as brown hematite of a very variable quality, but averaging 38 per cent. The position of the ore is a great advantage with respect to its possible exploitation. The deposits cover several thousand square kilometers, but are frequently interrupted for long distances.

"In certain points they form pockets five meters in depth. While as a rule they are near the surface there is always the possibility of their being too deep for economical working. At all events, Germany's situation today is such that the country must take advantage of every possible resource and adopt new methods of working, above all so far as concerns the recovery of the riches of the soil."

Various financial organizations are interesting themselves in the ore beds of Hunsruck and Franconia, but considerable time must elapse before their exploitation can be profitable. At present it appears that the ore is largely in the form of dust and has to be molded into bricks for the proper reduction.

Professor Beyschlag estimates that outside the region of the Suabian Alps Germany may still hope to find other deposits in Westphalia, near the western frontier.

Finally there is much talk in Germany as to the possibility of finding a combustible mineral oil in Hanover. Professor Beyschlag has visited various points in the district, and in his opinion nothing of commercial practicability is assured.

Wages Based on Guesswork

Industrial Unrest Likely to Continue Until Unscientific Way of Paying is Done Away With—Research Bureau Proposed for Determining Value of Services — Elements Lacking for Making Collective Bargaining Effective

BY A. L. DE LEEUW

UNREST among the laboring classes is so widespread that it is timely to discuss the various items which enter into the present relations between employer and employe, even if no prescription for a cure can be given at present.

It is well recognized that where two parties have a difference of opinion the first step should be to find some common ground from which to start, and that then the second step should be to define clearly and precisely the chief terms which enter into the controversy. One reason why discussions so often fail to bring the desired results and why they are often not started at all is that there is no clear understanding of some of the most commonly used terms in these controversies. The writer wishes to call attention to some of these terms, and to some of the misunderstandings in regard to their meaning.

We read practically every day about war between "capital" and "labor," about the demand of the laboring man for the "right to organize," and of his right to insist on "collective bargaining," and yet these three terms, which are perhaps used in every controversy that comes up, are not only not defined but they are actually misleading in themselves.

If war between capital and labor means anything at all, it must mean war between capitalists and laboring men. Capital is the result of past labor used progressively. Without capital, civilization is unthinkable. Capital is the tool with which the laboring man works. There can no more be war between labor and capital than between the laboring man and his tools.

Centralized Control Dangerous

In late years the control of capital has been more and more centralized, or, in other words, in the hands of fewer individuals. And though it is well recognized that this condition has its advantages in many ways, yet the dangers to which such centralized control may well lead have caused it to be regarded with suspicion and enmity.

It has been pointed out many times that there are really three parties, not considering the general public, which have a right to be heard in this controversy, namely, capital, labor and management. It seems to the writer that this merely leads to complication without any compensating features. Management and labor are both labor, but of different kinds. If at times they clash it is not due to unavoidable conditions but merely to defects in one or the other.

"Right to Organize" Misunderstood

Another term which should be quite familiar to all of us by this time is the "right to organize." Whether this term was purposely created by labor organizations as a slogan which ought to appeal to every fair-minded man, or whether it has just naturally slipped in, the writer does not know nor does he care. What he does care about is to have this term defined in such a way that no one with a fair amount of intelligence can mistake it for something else. If the purpose for which the employe wishes to organize is legal and proper, the third party, the general public, will naturally concede this right and quite as naturally inquire as to whether the employer has really denied this right to his employe.

Now, the facts in most cases where this right to organize has been brought to the foreground are these: A labor organization thinks it proper that the employes of a certain establishment should be gathered into its union. This, by the way, is perfectly proper, and no objection could be taken to it. The organization succeeds in gathering in part of the employes. The employer, fearing that this activity may lead to a strike, attempts to keep the other employes from joining the union; in other words, he tries to organize them with him instead of with the union. This also is perfectly proper. To make the claim at this point that the employe has been denied the right to organize may be good politics but is not quite correct. It is doubtful whether in late years there have been many cases where the employer has denied the employe the right to join the union, even if he was not in favor of it. When undesirable conditions or relations existed between employer and employe, or perhaps when union activities led to a strike, it was quite customary to make a demand on the part of the men for the right to organize, yet this right had seldom been denied. But put in this way the general public would get the impression that all kinds of organizations of the employe are taboo. What is really meant by the "right to organize" is that the employer shall give, not to *his men*, but to *some labor union*, the right to come into his shop and organize his men into a union; and apart from the question as to whether this is desirable or equitable, it is certainly different from the idea which the expression "the right to organize" conveys.

Another term which is misleading, even more so than those mentioned before, is "collective bargaining." So far collective bargaining has been collective, it must be admitted, but it has not been "bargaining." In collective bargaining it is supposed that some or all of the employes have delegated the right to bargain for them to some attorney or business agent.

Bargaining Has Never Been Used

In practically all cases this business agent is their union, and this union, according to the term used, is supposed to bargain with the employer. As a matter of fact, however, there is no bargaining, and, under the present conditions, there can be no bargaining. There have been cases where the men were entitled to all they asked for, and possibly more; there have been cases where the men were not entitled to as much as they asked for, but the method of bargaining has never been employed, and, in the writer's opinion, *could not* have been employed, to settle the differences. The issue has been brought to a conclusion by strikes, or threats of strikes, which is no more a method of bargaining than when a man points

---

From a paper presented at the annual meeting of the American Society of Mechanical Engineers, New York, December, 1919. The author, A. L. DeLeeuw, is a mechanical engineer.

a gun at his debtor to collect a bill.

There is still another point about this question of collective bargaining which should have all the light possible thrown on it. Is collective bargaining, bargaining by *all* the employes? Is it bargaining for a group or part of a group? If it is bargaining by a union, acting for a group, should the representative, the union, show credentials before bargaining starts? Such a course of action might reveal the weakness of the union or of the employer, but would it not be for the best interests of the third party, the general public?

In offering labor and demanding money, one of the principal requirements of a bargain is missing. When we say that the price of eggs is 75 cents, we mean, per dozen. When we say that the price of land is $200, we specify per acre. But when we say that the price of labor is 75 cents, we do not know what this means. There are measures or quantities by which to sell eggs or real estate. If a house is sold, though there may not be a measure of the value of the house, there is at least a chance for the prospective buyer to look it over and make his own estimate, or if you wish, guess, as to what the house is worth. But when it comes to buying labor we have no measure nor can we estimate its value by personal observation, except after the labor is done, which is long after the so-called bargaining took place, long after the price was set. It is true that labor is sold by the hour, but the hour is a measure of time, not of labor.

At the present time labor is not sold by measure but a workman sells his time. This inability to strike a bargain because the value of the product to be sold is entirely unknown, is, in the writer's opinion, one of the greatest difficulties to be overcome before there can be an equitable adjustment of the differences between employer and employe. The fact that labor is sold by the hour is equally unjust to both parties. Sometimes the employer suffers, sometimes the employe. In all cases it is a source of curtailment of production, and this leads at once to a discussion of wage system.

"Wage" is defined as remuneration for work done. It is also defined as remuneration for time given. The second definition seems to be defective. In the first place, when money is paid for time given it is called "salary." In the second place, and this objection is more serious, time alone is not bought or paid for. There are many occupations in which employes must wait until something turns up for them to do, and then they are supposed to do it. It would not be proper, then, to say that they are paid for their time. It would be more proper to say that they are paid for the labor which they perform within a specified amount of time.

There are cases where, practically speaking, time alone is sold. Such is the case, for instance, with a stationary watchman. Even in such an extreme case something more than time is paid for: the man's watchfulness and faithfulness. In other cases time and labor are paid for: For instance, with a machinist's helper, or a blacksmith's helper. In still other cases time and skill are paid for: For instance, the man running a large planer or boring mill.

Finding a Measure for Labor

The great problem before us is to find a measure for this labor, in order to obtain an equitable way of paying for it. In a large portion of work there is a combination of time, physical presence, labor, skill, knowledge, judgment, and probably other factors which are hard to define, such as reliability, steadiness, enthusiasm, loyalty, ambition, and whatnot. To make up a formula which would embody all these elements and from which a man's value could be calculated is, of course, impossible; and yet, unless this can be done there is no possibility of avoiding differences of opinion between employer and employe as to the value of a man's labor. The writer has gone into this matter somewhat at length, because to realize that a mathematical solution is not possible is also to realize that a compromise system *must* be developed.

There are various systems of payment in existence at present, straight wages, piece-work system, various systems of bonus payment, premium payment, and combinations of these systems. The wage system considers nothing but time and physical presence. The employe knows exactly what he will get, and guesses at what he will have to deliver. The employer knows exactly what he must deliver, and guesses at what he will get. He has no means to bring the employe's output up to his conception of what it should be, unless the employe falls so far behind the employer's expectations that he makes a new guess and fires the man.

With the piece-work system the employer knows exactly what he will get for his money, but the employe makes a guess as to how much he can reasonably do; he has no control over the conditions which will enable him to do, or prevent him from doing, as much as he is expected to. There are various kinds of bonus systems. The employe may earn his regular wages and get a bonus at stated intervals if his work exceeds the expectations of his employer; or he may be working under the task-and-bonus plan, in which case there is less guessing and more of an attempt at a definite bargain. If the employer is in earnest with such a system, and sees to it that it is possible for the employe to fulfill his task, then this system approaches quite closely to true bargaining.

The premium system is an attempt at gaining the interest of the employe by making him invent improvements in the method of working and sharing the profits with him; but unless the time originally set was carefully studied, and unless all conditions of machinery, tools, existing knowledge, and so on remain unchanged, this system also will lead to controversies and injustices.

To sum up, the pure wage system is no bargaining in any sense of the word; the piece-work system is only bargaining if employer and employe have reached an agreement, and if there is some mechanism by which this agreement can be changed as soon as conditions change; the pure bonus system is nothing else but a wage system with a kind of profit-sharing plan; the task-and-bonus system, if properly worked out and if accompanied by complete instructions to the employe, is a perfect bargain, but must be constantly revised as conditions change. However, this system carries with it the necessary mechanism to effect these changes.

It will be seen from the foregoing that wherever bargaining is possible it must be done, not only by each employe individually, but by each man separately every time his work is changed; in other words, each new operation he performs should lead to a new bargain. Unfortunately, the number of operations which can be fully analyzed and for which complete instructions can be given, is relatively small. There is no doubt but that it could be followed in many, many cases where it is not followed at the present. But, looking at the world's work in its entirety, the total percentage of the work which can be treated in this manner is small.

Whatever attempt has been made up to date to place labor on a con-

tract basis, on a basis of bargaining, has been done entirely by the employer, and has been antagonized by organized labor. And yet it is the writer's opinion that the ultimate solution of labor trouble must be based on some method of bargaining, probably collective. Taking the aims of organized labor to be: Proper share of the proceeds of labor, reasonable working conditions and working hours, right to organize and collective bargaining, the writer believes that these aims could all be accomplished without strife if the last item, collective bargaining, were put into actual practice instead of being a mere catchword.

If employers and employes together would put as the first item in their catechism the truth that the world must produce more in order to have more; if employer and employe together would try to find an equitable way of estimating the value of work done; if both would subscribe to the truth that no permanent gain can be made by wearing out a man's capacity for work nor by allowing him to work less than he should for the good of the world at large; if then employers and employes together would organize a bureau of research for defining the conditions under which various classes of work should take place; and if finally an attempt were made by both employers and employes to classify men according to their natural or acquired ability, there would be very little reason left why a union should be a fighting organization.

It is the writer's belief that the crux of the solution lies in the establishment of a proper wage system, and that in order to establish such a system the engineer must come to the assistance of labor in order to find standards of value for work done. Though it is not likely that there will ever be a time when every human activity can be scheduled and analyzed, yet by far the greater part of industrial operations can be treated in this way.

Standardizing Offers Difficulties

It hardly need be pointed out that to set such standards of value of work must necessarily be a gigantic task. In addition to the many technical difficulties in estimating values of products, there are other elements which must not be forgotten. There are many cases where operations are required which call for extreme skill, possessed by only a few, a skill which can never be found in the mass of the people. As a rule, people possessing such skill love to employ their gifts, they love their work and are willing to produce for less than their product is worth. Such skill should be estimated at its proper value, not only as a matter of justice to the workman, but also because he may finally lose his enthusiasm and industry at large would suffer.

There are operations where steady nerves are essential, some where physical courage is required, others which cannot be successfully carried out without many years of experience, etc. Such points should all be considered. The value of driving a rivet in some dangerous place of a new skyscraper is higher than that of driving a rivet in a boiler shop. The ability to judge the temperature of a piece of steel by its color is only obtained by many years of experience. This ability could not be called skill, though it is closely related to it.

Consideration should also be given to what constitutes a proper minimum and a proper maximum wage. In repetition operations it is sometimes possible for the operator to produce large amounts of work but only at the expense of extreme weariness, and in the long run such a man is not employed to the best advantage of the world at large. Recognition of this fact has led to the prescription of rest periods. On the other hand, there may be cases where it is expedient to employ men not skilled in the operation they are supposed to do. This may happen because skilled men are not available at a given time or place, or because special conditions call for an unusual amount of this class of work. Though the value of the product of such men might be low, they should receive not less than a minimum wage. This minimum wage, however, is in itself difficult to determine. A satisfactory minimum wage for an unmarried young man is not at all satisfactory for a married man with a large family.

The real cause of the present-day unrest lies in the fact that there is no unit of measurement which both employers and employes can use; or, in other words, the fact that our present wage system is not based on knowledge and justice, but only on guesswork and on the fear that the one may "do" the other.

Applying Electric Furnace to Foundry

BY W. E. MOORE

UP TO the present time the electric furnace has had its largest commercial development, first, in the manufacture of aluminum, second, in the manufacture of steel, third, in the manufacture of ferroalloys, and fourth, in the manufacture of calcium carbide. At the end of 1913 there were only 19 electric furnaces installed in the steelmaking industry in America. This number had increased to 136 at the end of 1916, and to 269 at the end of 1917. At the present time the number of steelmaking furnaces in use in various industrial countries of the world is 815, of which 290 are in the United States and 45 in Canada.

The average capacity of these furnaces in America is 0.37 tons per heat when used for ingots, and in the foundry business, 1.7 tons per heat, though the ordinary size now most generally used in foundries is the 3-ton. More than 99 per cent of all the steelmaking furnaces are of the arc type, less than 1 per cent being of the induction type, which was popular in the early days of the art.

Primarily, electric steel became popular because of its desirable physical properties. The bureau of standards reports regarding the superior qualities of electric steel as follows:

The characteristics of electric steel are great homogenity and freedom from segregation. It is somewhat higher in tensile strength and elastic limit than other steels and owing to its greater density, shows a marked resistance to fatigue.

Being absolutely "dead" when properly made and averaging lower in sulphur, electric steel in the foundry is less liable to show shrinkage cracks between ribs of castings, and, being more fluid, it is not so liable to piping, blowholes, cold shuts or misruns, and in tool steel it takes heat treatment more effectively and will stand greater abuse in heating.

The electric furnace is especially useful for making alloy steels. Since the metal is treated in a reducing

From a paper presented at the annual meeting of the American Society of Mechanical Engineers, New York, Dec. 2-5, 1919.

atmosphere, there need be no large losses of the added elements, such as silicon, manganese, vanadium and chromium.

The acid-type furnace is best suited for foundry work and the most popular size has a capacity of 3 tons per heat, though sometimes 1.5-ton or smaller furnaces are required. The more highly powered and rapid furnaces for such work turn out from eight to 16 heats in 24 hours, and with a power consumption of from 500 to 650 kilowatt-hours per ton of liquid steel and considering the ultimate efficiency of the large modern turbo-generator power house at, say 1.5 pounds of coal per kilowatt-hours, its fuel consumption might be said to be equivalent to from 750 to 900 pounds of coal per ton melted, and the coal need not be of high grade nor low in sulphur and phosphorus as is necessary with fuel-fired furnaces. Basic furnaces require more time and power, heats ranging from four to eight per day, and since the charge is melted in a reducing atmosphere there is practically no oxidation of the metal; consequently thin scrap, light turnings or scrap of other forms such as can be conveniently charged into the furnace, may be melted. Such scrap on the present market sells for approximately from $5 to $10 per ton less than low-phosphorus, heavy melting scrap necessary with the ordinary acid open-hearth melting furnace installation.

The furnace atmosphere, being of a reducing nature, makes it easier to refine and kill the steel, resulting in a saving amounting frequently to half of the ferroalloys necessary with converter steel, effecting a saving of, say, $2 per ton.

Comparative Costs of Electric and Converter Steel

With the electric furnace, men can readily make and check their steel to an exact percentage of carbon, manganese and silicon and can easily keep the undesirable sulphur and phosphorus to low limits. The steel may be readily alloyed with nickel, chromium, and vanadium to make the higher grades of steel castings to replace forgings and for special purposes, such as may be required for parts of unusual strength, ductility or for cutting tools. It is entirely feasible to make castings which will run up to an ultimate strength of 130,000 pounds per square inch, or to cast high-speed steel milling cutters and reamers to form for grinding.

Very fine results have been obtained with malleable iron made by treating cupola metal or by melting cold scrap in an electric furnace. The ability to refine for sulphur and phosphorus and to add ferroalloys to adjust the mixture to the proper malleabilizing formula, together with its very rapid operation, give the electric furnace a decided advantage in malleable-iron foundries, particularly in working on high-phosphorus southern irons.

In the nonferrous metal industry the electric furnace has shown remarkable economies, due to the saving of cost of crucibles and the greatly reduced metal losses caused by oxidation and volatilization. For such work special types of furnaces designed to avoid localized heating are necessary.

As to the most suitable type of electric furnace for a given installation, if the scrap be inferior and high in sulphur and phosphorus, then the extra cost, slower operation, and shorter refractory life of the basic furnace must be endured to obtain the lower limits of sulphur and phosphorus not practicable to reach with the acid furnace using poorer grades of scrap. At present the call is for acid-lined furnaces, and cheap, good scrap is available in large quantities for foundries, and basic furnaces for alloy and tool steel. The acid furnace is simpler, cheaper and faster to operate and the steel casts more easily, while the basic furnace is essential for tool steels.

It is strongly recommended in any case that a furnace be so designed and constructed that it is adaptable to basic operation. This means that the furnace shell must be of large diameter and the bath of large area and shallow. The furnace should not, it is thought, be of the long-arc type, nor of the small diameter, deep bath type, if the best and most rapid work is contemplated. Indeed, even for acid melting there is a noticeable difference in the quality of the steel obtained from the large diameter, shallow bath furnaces compared with that made in the deep bath type furnace, for with the latter it is not feasible to obtain the same mechanical reactions from the additions put in to refine and kill the steel as when the bath is of the shallower type. Nor is it possible so thoroughly to deoxidize the metal by maintaining a reducing atmosphere in the furnace.

It is quite important that the furnace should operate at the highest practicable power factor that can be obtained without undue disturbance of the power company's load, for by so doing the electrode, transformer, line and generator losses are maintained at a minimum. Engineering skill of a high order is required to forecast and select the best type of equipment, under the many varied power-supply conditions which obtain in different localities.

By reason of the now generally acknowledged superior quality of the product, greater flexibility of operation, quicker, more convenient sized heats, and saving in alloys and in cost of melting stock, the electric furnace is rapidly coming to the front in the steel foundry and alloy and tool steel works wherever suitable power is available and progressive policies are in vogue. It is making possible the profitable operation of widely distributed small steel foundries to an extent not generally realized and greatly reducing the investment cost required in tool steel works.

Engineering Dean Defines Proper Training

That the federal control of education is undesirable was the opinion expressed by C. H. Benjamin, dean of the school of engineering of Purdue university, Lafayette, Ind., before a recent meeting of the Cleveland Engineering society. Dean Benjamin defined education as the training of mental powers rather than the acquisition of knowledge. Boys are placed in three arbitrary classes: Those who go to work at 16, those who go to work at 18, and those who go to college. As a result each class must have different education in order that its members mature into good citizens. The first group, which finishes the grade school, should not have vocational work as plenty of time is offered for apprenticeship work to gain that training. All of the time should be spent in fundamental teaching. Some vocational work should be given the second group, which attends high school, as the period in which to obtain training through apprenticeship is limited. The third group should receive proper training to prepare the members for college courses.

Five and six-year college engineering courses seem too long since most students are dependent upon their parents during that period. As a result the four-year course must be compact and well balanced. Extensive teaching of English is highly essential and foreign languages are desirable since they result in good expression. Shop practice should be well advanced to illustrate efficient methods. Economic problems and their suggested solutions should receive much attention.

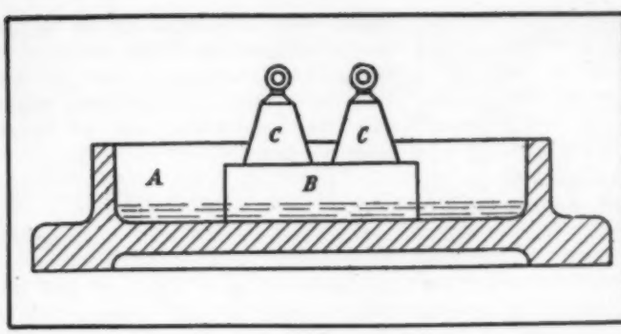


Fig. 1—Formation of Oil Film, Initial Stage

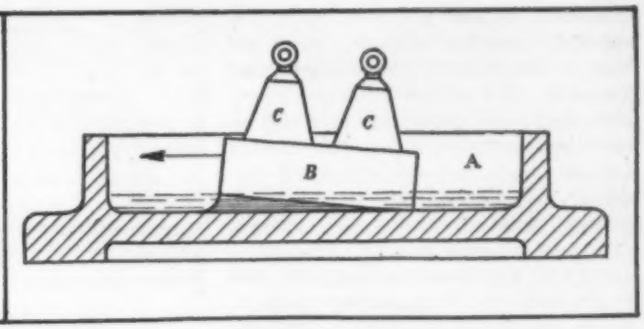


Fig. 2—Formation of Oil Film, Final Stage

Selecting Lubricants for Bearings

Principles Underlying Lubrication of Ball Bearings Differ From Those Applying to Plain Bearings — In Ball Bearings Oil Film is Only Possible at High Speeds When Slippage Occurs

BY H. R. TROTTER

AN INVESTIGATION of existing literature on the subject of ball-bearing lubrication reveals the fact that up to date a comprehensive study of this particular phase of lubrication has not as yet been published. The efficient lubrication of the plain sleeve-type bearing presents few difficulties, as the engineering world is in possession of an accumulation of data acquired during many years of patient study, experiment, and practice.

In 1885 Beauchamp Tower completed a series of experiments which he had made to obtain data regarding the behavior of a lubricant under various loads and speeds. These experiments were made at the request of the British Institute of Mechanical Engineers, and were later made the subject of a very thorough mathematical analysis by Prof. Osborne Reynolds. The outstanding feature of these experiments was the discovery of the wedge-shaped film of oil. Professor Reynolds later gave the rule for efficient lubrication, which is that where two surfaces are in sliding contact a satisfactory film of oil cannot be maintained unless the surfaces are at slight inclination to each other.

From a paper presented at the annual meeting of the American Society of Mechanical Engineers, New York, Dec. 2-5, 1919.

Oil Film Is Wedge Shaped

Fig. 1 shows a pan or tray *A* containing a small amount of oil. A flat plate *B* is loaded with weights, *C*. When in a stationary position the surfaces of the plate and pan are parallel to each other, but if the plate is pulled along the surface of the pan the leading edge rises and the plate flows on an oil film with the surfaces at an inclination to each other. The oil film assumes the shape of a wedge, as shown in Fig. 2.

The Michell thrust bearing, which is manufactured in Great Britain, and the Kingsbury thrust bearing, made in this country, are designed to take advantage of this phenomenon and both have proven very successful. The main features of a bearing of this type are shown diagrammatically in Fig. 5. *A* is the rotating member. *B* is the stationary member. The parts *C* are supported on pivots *D*. A bearing of this type with a diameter of 18 inches successfully accepts a thrust load of 160,000 pounds at a speed of 35 revolutions per minute.

The oil grooves of a sleeve-type bearing should be of such shape as to allow the formation of this oil wedge. Fig. 3 shows a correct groove and Fig. 4 an incorrect groove. When forced feed lubrication is used, the oil should enter the bearing at a point of low pressure and not at the bottom of the bearing which is near the point of maximum pressure. The oil grooves in a sleeve-type bearing are generally made wedge shape and not of semi-circular section, as experience shows that this is necessary to the formation of the lubricating film. The oil inlet on a force-feed bearing is placed at a point which is approximately the point of lowest pressure and not at the bottom of the bearing.

The final choice of a lubricant is at best the result of a compromise between the engineer and the chemist. This compromise is very often unsatisfactory and due in part to the chemist's inability to thoroughly comprehend the engineer's problem and in part to the engineer's lack of chemical knowledge.

All authorities are not agreed on the desirable qualities of a lubricant. Many claim that a high surface tension is a requisite, and others lay great stress on adhesive qualities. All are agreed, however, that a lubricant should have the minimum of internal friction. Generally speaking, the requirements of a lubricant for the plain sleeve type of bearing are a certain amount of adhesive quality

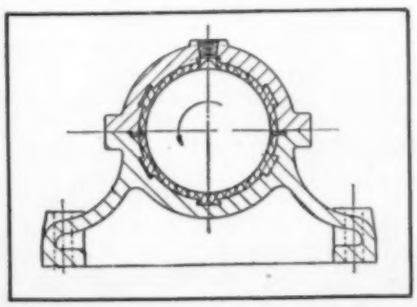


FIG. 3—CORRECT OIL GROOVE OF SLEEVE TYPE BEARING

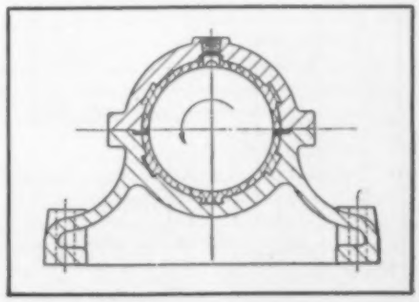


FIG. 4—INCORRECT OIL GROOVE OF SLEEVE TYPE BEARING

to enable it to adhere to both the revolving and stationary surfaces. It should have sufficient body to withstand the pressures. The lubricant film will therefore consist of three layers, which in operation approximate the features of a ball bearing in that one element is stationary, one rotating and one an intermediate layer consisting of globules similar to the balls in a ball bearing.

Body in a lubricant cannot very well be defined. It seems certain that its effects are opposite to those of viscosity. Professor Kingsbury gives the following relations of viscosity and body:

With increase of	Where the viscosity is effective the coefficient of friction	Where the body is effective the coefficient of friction
Pressure.....	Decreases	Increases
Speed.....	Increases	Decreases
Temperature....	Decreases	Increases

The two cardinal points of successful sleeve-bearing operation are: A design of such a type as will permit of the formulation and preservation of an oil film, and the selection of a lubricant that will provide a film of maximum strength with a minimum of internal friction.

With a ball bearing, however, the problem is not so easily understood, but the important points to be remembered are that the coefficient of friction is practically constant throughout wide ranges of loads and speeds; that an oil film is only possible at very high speeds when slippage may take place because the moving parts have metal-to metal contact; and that the coefficient of friction is lower in an unlubricated ball bearing at light loads and moderate speeds.

Coefficient of Friction Varies

In Fig. 6 curve *A* shows the change of friction coefficient of a plain bearing under constant load and varying speed. This curve is self-explanatory and shows that a satisfactory oil film is not formed till a certain speed is reached. In the same figure curve *B* gives the friction coefficients of a well-made ball bearing, and shows that the friction loss of a ball bearing is practically constant throughout wide ranges of speed. If an

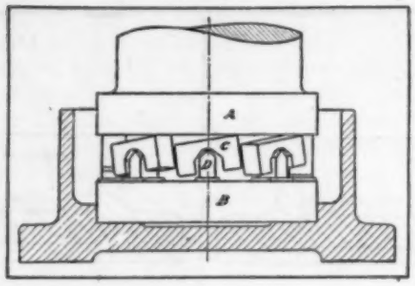


FIG. 5—DIAGRAMMATIC SKETCH OF MICHELL TYPE OF THRUST BEARING

oil film were formed between balls and races, curve *B* would possess the same general characteristics as curve *A*.

The difference between the friction coefficient of a lubricated and unlubricated ball bearing is shown in Fig. 7. This property of a ball bearing is not generally known, and should not be used as an argument in favor of operating ball bearings without lubrication. From the foregoing statements it should be evident that plain bearings and ball bearings possess such radically different characteristics that a true comparison is impossible. It naturally follows, therefore, that practically all the accumulated experience of the lubricating engineer is of little value when analyzing ball-bearing operation.

The use of a lubricant with ball bearings is necessary to protect the highly polished surfaces of the balls and raceways, and to minimize the slight friction between the balls and ball retainer. The small amount of friction between balls and retainer can also be minimized by careful design. The principal requirement of a ball-bearing lubricant is chemical neutrality. The lubricant used must not contain over 0.10 per cent acid or alkali. There are many commercial lubricants on the market which come within this limit, but very few are acceptable because of their tendency to develop acid with age or when operating at high temperatures.

Experience shows that the most satisfactory lubricant for ball bearings is a highly refined mineral oil having the proper viscosity and cold test for the installation. Greases should be used only when operating conditions require viscosities greater than can be obtained with a mineral oil.

Should Not Run Submerged

Whenever a ball bearing is operated at high speeds, it is not advisable to run it submerged in a lubricant, and provision should be made to supply the oil from a pressure system. If such a system is not available, good results may be obtained by a large sight-feed oil cup. A few drops of oil per minute is all that is required.

At moderate speeds a heavy oil will generally give better results than a light oil. The substitution of a heavy oil for a light oil will generally result in a decreased operating temperature. This peculiarity may be explained by the fact that when the bearing is running at the actual operating speed, less opposition is offered to the rotation of the balls by the oil because of the inertia of the oil. In addition, there is less churning and frothing with their resultant air pockets. Air pockets in a lubricant act as insulators and prevent the transmission of the heat generated to the outer casing where it can readily be dissipated.

All mineral oils used on ball bearings should be highly refined, filtered, and contain a minimum amount of acid, alkali or sulpho compounds, and in order to insure the use of such oils the following specifications are suggested:

Free acid (calc. as oleic acid), maximum, 0.10 per cent; free alkali, absent; ash, maximum, trace; heat test (15 minutes at flash point), slight darkening, but no sediment; flash point (Cleveland open cup), minimum, 300 degrees Fahr.; fire test, minimum, 350 degrees Fahr.; viscosity at 100 degrees Fahr., Saybolt universal for light oil, 100 to 200 seconds, medium oil 200 to 300 seconds, heavy oil 300 to 500 seconds, and extra heavy oil, more than 500 seconds.

Most of the high-grade mineral oils

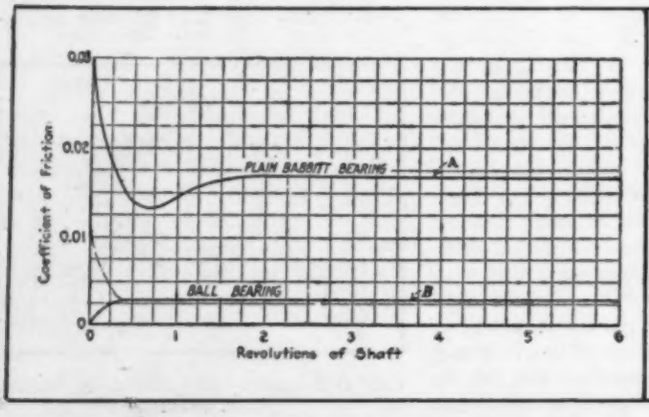


FIG. 6—FRICTION COEFFICIENTS OF A PLAIN AND A BALL BEARING

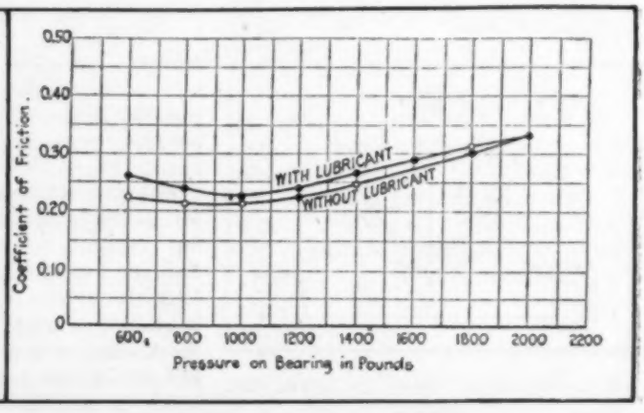


FIG. 7—FRICTION COEFFICIENT OF A BALL BEARING

conform quite closely to the above specifications. In connection with lubricating greases, however, the problem is more difficult. Many of the greases now on the market are entirely satisfactory for general purposes, but lack certain characteristics which experience shows to be highly important for successful ball-bearing lubrication.

A large number of greases contain lime soap as thickeners, a few are of the soda-soap type, while others are a combination of both. The lime greases are valuable in that they can be used without harmful results where moisture is present. Their consistency, however, is more easily changed by heat than greases of the soda type.

Suitable specifications which insure the production of lubricants suitable for ball bearings without putting any undue burden on the lubricant manufacturer are as follows:

Free acid (calc. as oleic acid), maximum, 0.10 per cent; free alkali (calc. as sodium hydroxide), maximum, 0.10 per cent; free lime (calc. as calcium oxide), maximum, 0.5 per cent; neutral saponifiable oil, maximum, 1.10 per cent; viscosity of mineral oil (minimum 200 sec., Saybolt universal, 100 degrees Fahr.), and abrasive particles (sand, etc.), absent.

Ball bearing manufacturers are quite agreed that the limit of free acid in a grease should not exceed 0.10 per cent calculated as oleic acid, and there are plenty of greases available which meet this requirement.

It is essential that the grease be comparatively free from unsaponified fatty oil, or as expressed in the analyses, "neutral saponifiable oil." This specification is imposed because the unsaponified fatty oil has a tendency to become rancid or develop an acidity with age in service, particularly when operating at high temperatures. We have established a limit of 1.0 per cent, and the above tables show that this can be met in most of the compounds which are suitable in other respects.

High Grade Mineral Oil is Best

One feature of grease lubrication which cannot be too highly emphasized is the importance of using a high-grade mineral oil conforming to the tests for purity as previously outlined. A grease may be perfect in every other respect, yet if a poor grade of mineral oil is used, the life of the bearing will be shortened.

In view of the high polish necessary on ball bearings, the elimination of abrasives such as sand particles, etc., is manifestly important.

It is also desirable to keep the free-lime content of the grease down to a minimum as any excess detracts from the lubricating qualities of the grease. Experience indicates that 0.5 per cent is a desirable limit. In some of the greases that the author has examined, small lumps of free lime were discovered to be distributed throughout the grease.

The highest grade ball-bearing greases are put through a milling process after compounding. This treatment insures very intimate mixing of all constituents and pulverizes any chance impurity to an impalpable powder.

Microphotographs of various greases are reproduced in Fig. 8. *A* shows the crystals of calcium sulphate obtained from lime-soap grease; *B* crystals obtained from a soda-soap grease; *C* crystals obtained from a lead-soap grease and *D* crystals obtained from a potash-soap grease. Further investigations should be made to obtain data so that lubricating-grease specifications may be standardized.

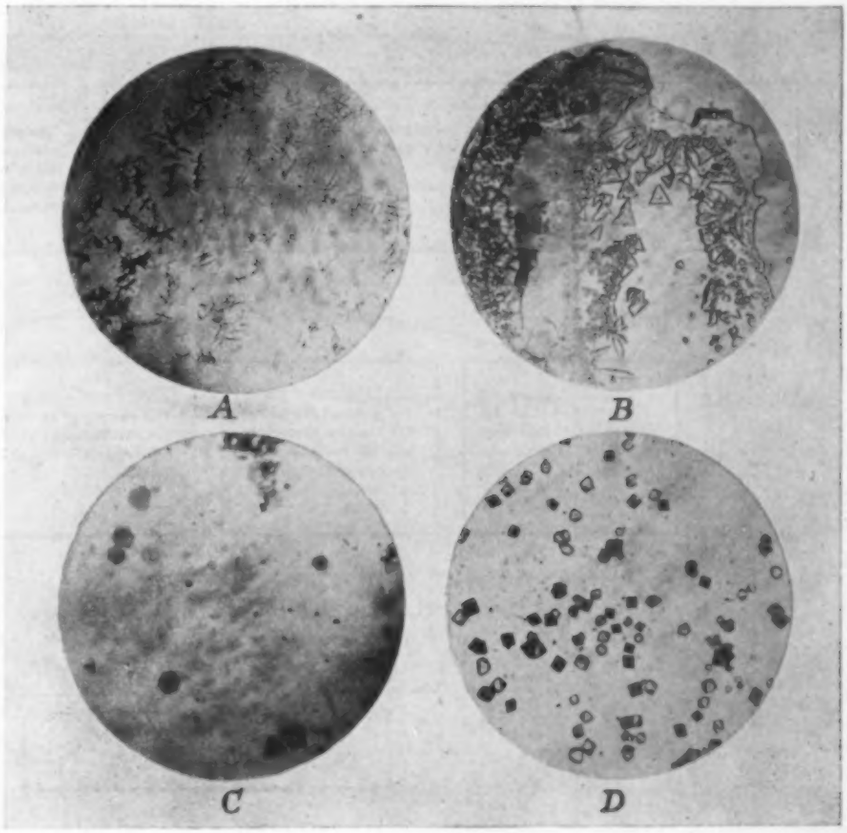


FIG. 8—MICROPHOTOGRAPHS OF VARIOUS TYPES OF GREASES

Book Review

Foundry Practice, a text book for molders, students and apprentices, by R. H. Palmer; cloth; 390 pages, 5 by 8 inches; published by John Wiley & Sons, Inc., New York, and furnished by THE IRON TRADE REVIEW for $3 net.

The second edition of this book has just been published, much of the text has been rewritten and subject matter has been added. The additions include a description of the rigging and flasks and details the processes of securing and pouring molds to produce large propeller wheels economically. Other new matter in this edition deals with the patterns, flasks, cores, molding, setting and securing cores, gating pouring, and testing the iron for locomotive slide valve cylinders.

As in the previous edition this book goes thoroughly into the question of molding in its every phase. Green-sand molding is considered first, and methods are described for molding irregularly shaped patterns including gears. Pit molding, floor molding and bench molding also are described. Dry sand work and loam molding are fully detailed. After the subject of making and setting cores is finished, the questions of molding machines, sand and metallurgy of iron are presented. Under metallurgy might be classed the chapters on iron and its composition, the treatment of castings while cooling, mending broken castings, and the chapter on the cupola and its operation. In the back of the book is a glossary giving definitions of foundry terms and a number of tables containing useful data for the foundryman.

Organizing Modern Stores Department System Simple, With Few Form Cards

BY M. H. POTTER

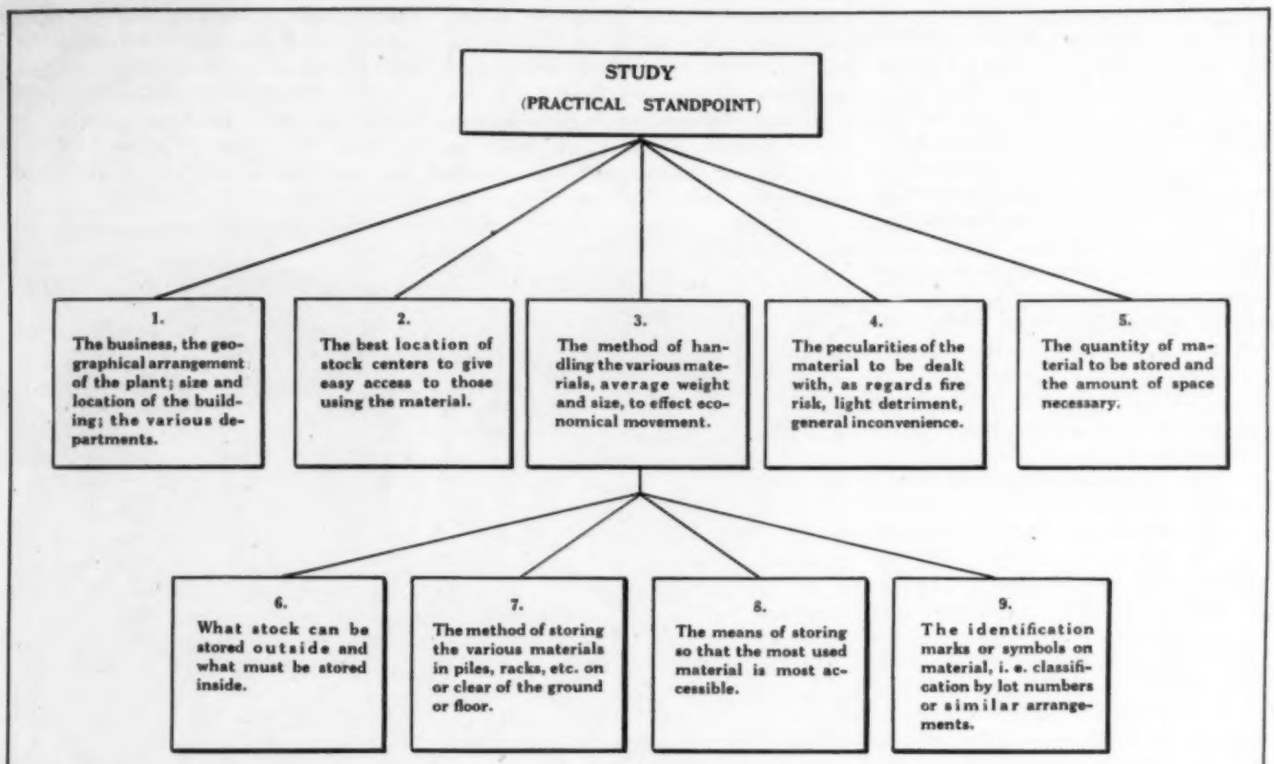

STUDY
(PRACTICAL STANDPOINT)
1. The business, the geographical arrangement of the plant; size and location of the building; the various departments.
2. The best location of stock centers to give easy access to those using the material.
3. The method of handling the various materials, average weight and size, to effect economical movement.
4. The pecularities of the material to be dealt with, as regards fire risk, light detriment, general inconvenience.
5. The quantity of material to be stored and the amount of space necessary.
6. What stock can be stored outside and what must be stored inside.
7. The method of storing the various materials in piles, racks, etc. on or clear of the ground or floor.
8. The means of storing so that the most used material is most accessible.
9. The identification marks or symbols on material, i. e. classification by lot numbers or similar arrangements.

FIG. 1

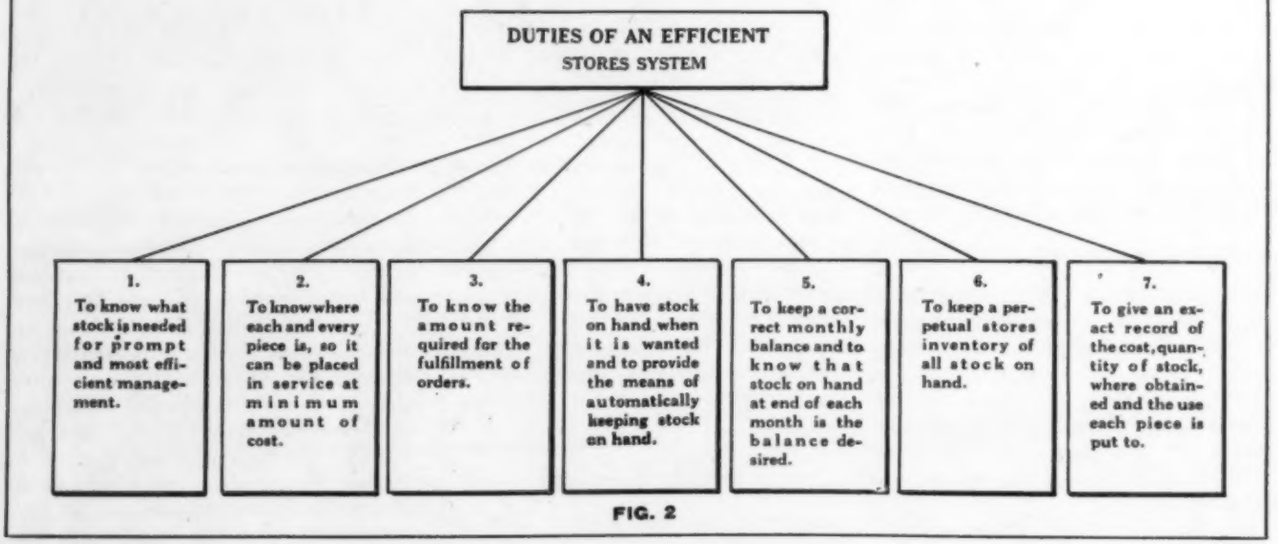

DUTIES OF AN EFFICIENT
STORES SYSTEM
1. To know what stock is needed for prompt and most efficient management.
2. To know where each and every piece is, so it can be placed in service at minimum amount of cost.
3. To know the amount required for the fulfillment of orders.
4. To have stock on hand when it is wanted and to provide the means of automatically keeping stock on hand.
5. To keep a correct monthly balance and to know that stock on hand at end of each month is the balance desired.
6. To keep a perpetual stores inventory of all stock on hand.
7. To give an exact record of the cost, quantity of stock, where obtained and the use each piece is put to.

FIG. 2

ALTHOUGH the importance of an efficient stores system in manufacturing plants is generally acknowledged, many organizations lose much time in locating material, and also allow much material to go to waste owing to the lack of a little attention to this matter. An elaborate or expensive system is not necessary, but the establishment and maintenance of a satisfactory system require practical study, analysis of conditions, and the keeping of several card forms. Once in operation, the system may be easily maintained without trouble.

STORES CARD

ITEM			ORDER LOTS OF	AVER.	MIN.
SECTION	SPACE	REMARKS—			

Date	Quantity Ordered	Purchase No. or Job No.	Quantity Delivered	Price (Each)	Balance	Balance (Value)

FIG. 3

MATERIAL CARD

No. DATE 191

DEBIT	CREDIT

Quantity	Description	Price	Total

FIG. 4

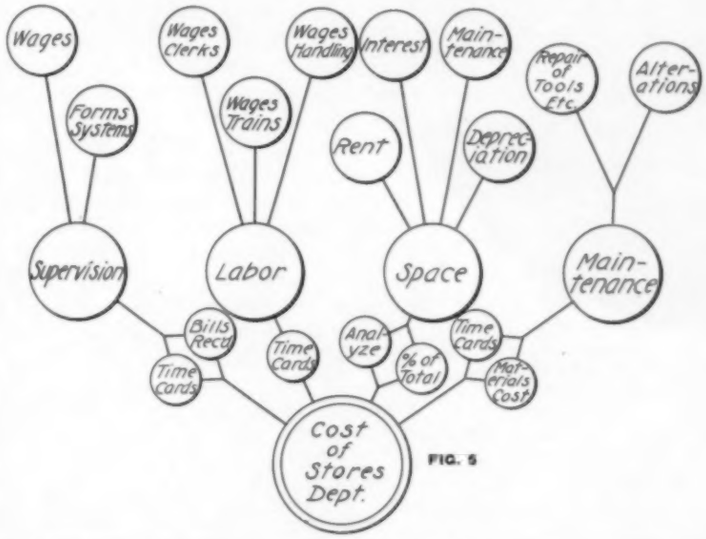


FIG. 5

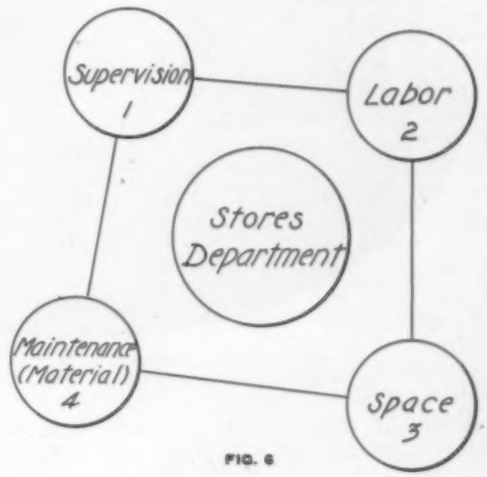


FIG. 6

The accompanying diagrams set forth in concise form the duties of an efficient stores department and the lines along which a practical study of its establishment and operation will proceed. These points should be carefully considered in order that important features be not overlooked and the department become only a makeshift, while it may just as readily be made to serve the full scope of its purpose.

The stores card not only serves to locate materials, but also provides a means for keeping account of the materials on hand and their market or cost value. Each stores card give the name and a brief description of the piece of material; location of stock and the minimum and maximum quantities which may be drawn from it. The material card is used to record the quantity, description and value of the stock on hand at the end of each month. It is filled in at the end of the month by the stores clerk.

In keeping a record of the cost of such a department the diagrams relating to cost factors and accompanying this article will prove helpful.

Figures issued by the United States geological survey for the first six months of 1919, show that zinc produced from domestic ore was 247,584 tons and from foreign ore, 7918 tons, a total output of 255,502 tons, as compared with 260,664 tons in the last half of 1918 and 257,263 tons in the first half of that year. It has been calculated that consumption during the first half of 1919 was 159,501 tons. In addition to

the zinc produced from ore, a bulletin issued by the survey states that 7328 tons were redistilled from zinc ashes, skimmings and drosses. The bulletin further states that many zinc smelters have been dismantled during the last year and a half and many others abandoned. The total number of retorts at plants at which there were some operations during the first half of the year is 158,988, compared with 224,778 on June 30, 1917. The number in operation June 30, 1919, was 82,000 compared with 123,500 at the end of 1918 and 204,500 at the end of 1916.

Develops Porcelain for Industrial Use

ONE of the remarkable achievements attained by British industry under the pressure of war was the application of high class porcelain to laboratory and steel works use. Until the emergency of war intervened British manufacturers had been hesitant in entering the field of industrial porcelain on account of the high reputation then accorded the German product. The annual importation of German laboratory equipment totaled a large amount annually, which was peremptorily stopped by the war.

Because of the special laboratory work which became necessary soon after the outbreak of the war and because of the urgent needs of steelmakers, producers of explosives, and others, a number of porcelain manufacturers of Great Britain turned their efforts toward developing a product of sufficient refractoriness to withstand the exacting demands of pyrometry work.

One of the first firms in England to engage in this work was the Worcester Royal Porcelain Co., Ltd., which until the outbreak of the war had confined its facilities to making high grade porcelain for artistic and domestic purposes. A considerable amount of research work was necessary in order to find material which could be reduced to a perfectly vitrified, nonporous state and which at the same time would be refractory when exposed to high temperatures. It was equally necessary to discover glazes which could be applied to the body material without cracking or breaking during rapid heating and cooling as in the case of pyrometer tubes and other laboratory supplies of this kind. That this company has been successful in its efforts is indicated in a recent report made by Walter Rosenhain, director of the national physical laboratory, Teddington, in which the British-made article was subjected to parallel tests with the porcelain of Berlin. In each case the British product compared favorably with the foreign ware and in many instances demonstrated its superiority. As a result of the success achieved, many British steel works now are using pyrometer tubes, crucibles, capsules, funnels and numerous other laboratory requisites made in the United Kingdom.

The porcelain is prepared from a combination of china clay, Norwegian felspar, various flints, etc., carefully calcined to get rid of superfluous matter. The grinding alone occupies about 40 hours. Iron and steel particles are extracted from the moisture by magnetic means and powerful cloth and wood presses are used to get rid of superfluous moisture. The mixture is then passed through a sieve of extreme fineness. The baking and glazing operation requires unusual skill and decided accuracy.

FIG. 1 (LOWER)—MEASURING PORCELAIN PYROMETER TUBES
FIG. 2 (UPPER)—MAKING CRUCIBLES FOR LABORATORY WORK

In testing the refractory porcelain, laboratory experts decided that the three reagents most likely to attack the porcelain were strong sulphuric acid at the boiling point, a 10 per cent solution of caustic soda at from 90 to 100 degrees Cent. and a 10 per cent solution of sodium carbonate at from 90 to 100 degrees Cent. Each of these tests were continued for four hours. Concentration of the reagent by evaporation was prevented in the last two tests by conducting the experiments in a closed oven. The same volume of liquid was used in each case and the areas wetted were calculated. From these results the amount of material dissolved of 100 square centimeters of wetted surface was determined. In the case of the Berlin porcelain the area wetted was 176 centimeters; the alteration in weight, 0.0016 grams and the loss per 100 centimeters was 0.0009. With the British ware the wetted area was 209 centimeters, the alteration in weight, 0.0016 grams, a gain in this case of 0.0008.

In Fig. 1 porcelain pyrometer tubes are being measured and in Fig. 2 crucibles in progress of manufacture are shown.

A.S.M.E. Undertakes New Work

After Devoting Considerable Attention to Labor Problems, Society Adopts Statement of Principles and Lays Foundation of Machinery For Studying Subject of Industrial Relations—Seven New Officers Elected

ALTHOUGH the subject of industrial relations frequently has appeared on the programs of the past annual meetings of the American Society of Mechanical Engineers, the first definite move committing the society to active participation in the work of studying and helping to adjust present day problems of industrial unrest was taken Thursday at the close of the session of the third day of the fortieth annual meeting at the Engineering Societies' building, New York. From the first day of the meeting, which was unusually well attended, the interest of the majority of engineers centered upon the various phases of the labor problem and continued in increasing intensity until late Thursday when it culminated in formally adopting a statement of principles, authorizing the appointing of a committee to study the agencies of productivity, and taking other action calculated to create the machinery for setting the society to work on the problems of industrial unrest.

At the first session of the meeting, held Tuesday evening in the auditorium, M. E. Cooley, dean of school of engineering, University of Michigan, and retiring president of the society, delivered the annual presidential address. The election of new officers was announced and honorary memberships were conferred or announced. A business session was held Wednesday morning, and in the afternoon simultaneous sessions on appraisal and valuation, aims and organization, and gas power were held. In the evening a meeting was held to commemorate the thirtieth anniversary of the death of John Ericsson and of Cornelius H. D. Lamater, who collaborated with Captain Ericsson in much of his work.

The industrial relations session, which opened Thursday morning, reconvened in the afternoon and continued simultaneously with sessions on machine design, power machinery, and textiles. Three sessions held at the same hour on Friday morning covered transportation, machine shop practice, and general topics. The entertainment features included the annual reunion and dance, held Thursday evening, and numerous inspection trips to points of interest in and near New York.

Urges Employers to End Antagonism in Industry

PREDOMINATING the entire convention and far surpassing any other topic in point of interest aroused, the subject of industrial relations held the attention of an audience which taxed the capacity of the auditorium Thursday morning and after recess discussed various phases of the problem until late in the afternoon in another assembly hall. The discussion was introduced early Thursday by Frederick P. Fish, chairman, national industrial conference board, who delivered a brilliant address on the causes of industrial unrest and their remedy. In introducing this subject Mr. Fish declared that the fundamental difficulties in the present situation are largely historic. Fifty years ago, he said, there were no large industries and inasmuch as almost all employers were in daily contact with their workmen, there were no opportunities for misunderstandings. During the past 50 years this condition has changed with the introduction of power driven machinery, the utilization of electricity, and the organization of large industrial establishments. During the last 30 years, of this half-century, the energies of engineers and employers have been devoted largely to developing mechanical details and the machinery of organization. As a result of this concentration, the United States leads the world in the ability of its manufacturers to organize industry in large units.

However, in devoting their attention to eliminating physical difficulties, the employers neglected the public interest and the subject of employment relations. It is their neglect of these two important factors which has brought on the present situation, emphatically declared Mr. Fish.

Point of View is Wrong

Referring to the part played by politics in the present period of unrest, the speaker stated that the point of view of the government in dealing with workmen has been wrong. Instead of cajoling workmen as has been the practice of the government, labor should have been approached in a manner which would have enabled the two agencies to work in harmony. Admitting that labor unions have done some good, Mr. Fish declared that they have been guilty of the crime of intimidating workmen, appealing to mob rule, disrespecting the law and depressing production. These policies, fostered by labor unions have been the means of accentuating the need of reform and have brought the attention of employers to the subject.

Unfortunately, stated Mr. Fish, labor unions have progressed on the principle that the less work performed the better is the cause of unionism. In the United States unions have not been able to establish the closed shop but in England 90 per cent of the industry was in control of the closed shop. These conditions enabled the average American workman in 1913-1914 to do from three to four times as much as the average English workman. In England, at the outbreak of the war, it was necessary to get the unions to revoke the principle of low production on the promise to return to prewar conditions at the close of the war.

Unionism is not sound because it surpasses production and freedom of contract. The closed shop would be fatal.

There can be no panacea by the way of legislation or of revolution. This was particularly brought out in the recent election in Massachusetts where labor voted for governor-elect Coolidge because of his stand for law and order. This proves, claimed Mr. Fish, that labor is true to the United States when the workmen understand the issue.

Since the present situation cannot be improved by law or by the change in the social structure, employers must instigate the move for reconciliation. Employers must organize their industries so that they can know their employes, learn their aspirations, listen to their complaints, and meet them on terms of equality—but not equality of power and capacities.

Both employers and employes must be taught that no one gains from the suppression of production. There are 450,000 industries in the United States.

Of these 98 per cent are small, and in these plants it is only necessary for employers to understand their men. In the larger plants the problem is an individual one. If employers in large companies devote as much time, attention, and painstaking study to the subject of industrial relations as they do to the mechanical and technical details of business, the present conditions would soon vanish.

The shop committee, claimed Mr. Fish, although new, has great possibilities. Supply and demand never again can be the sole dictator of wages. In the future, capacity, skill, speed, etc., must be factors in determining wages. The proper hours of labor are the longest hours per day compatible with good health. Conditions must govern the hours of work and it is not fair to state that the 8-hour day fits all cases of employment. That the 8-hour day does not satisfy workmen in many cases is proved by frequent strikes in which the strikers demand the opportunity to work overtime.

Cut Unemployment to Minimum

As another means of meeting antagonism, employers must strive to cut down unemployment as much as possible. In time of depression, employers should make every effort to hold their men as long as possible and to keep their heads in time of panic or industrial prosperity. Employment of men must be conducted in accordance with the principle of securing the right man for the right job. An employment department should be inaugurated to intelligently employ men. Employers should take an interest in the permanency of the jobs of their employes.

The recent war showed that organization possessed of the proper spirit of co-operation and teamwork achieves the greatest results. This has been true in all lines of human endeavor and it will prove equally true in industry. Employers must do away with the present antagonism existing in business and must get ready to inoculate the organization in their plants with the healthy spirit of co-operation and teamwork. Mr. Fish expressed the belief that employers now are ready for this movement.

Following the address of Mr. Fish, A. L. DeLeeuw, consulting engineer, New York, presented a paper on wage payment which appears elsewhere in this issue. A paper on systems for mutual control of industry by William Leiserson, formerly chief, division of labor administration, United States department of labor, was read by Calvin E. Rice, secretary of the society. In a noteworthy address on profitsharing, entitled, "What May We Expect of Profit Sharing in Industry?" Ralph E. Heilman, dean, school of commerce, Northwestern university, Chicago, declared that there are great opportunities for profit sharing in industry. He called attention to the fact that the subject of profit sharing has experienced a revival of interest during the past few years. To be successful, profit sharing must justify itself and must show economic results. It is best used in plants where work is not easily measured; as a means for retaining employes and for reducing labor turn-over, and for creating interest and rivalry among men holding managerial positions.

Professor Heilman pointed out that the higher the rank of employes participating in profit sharing, the greater is the opportunity for results. Moreover, in case of business depression the worker in the rank-and-file becomes suspicious when his share of the profit dwindles to a low figure, whereas the salaried man in a managerial position who is familiar with business conditions, thoroughly understands why profits are low and is more likely to do his best to counteract the effects of business depression. According to the speaker, profit sharing for salaried employes above the rank of foreman has unlimited possibilities.

New Officers

President

FRED J. MILLER

Member of technical advisory committee of war claims board, Washington, D. C.

Vice Presidents

JOHN ROBBINS ALLEN

Director research bureau, American Society of Heating and Ventilating Engineers, Pittsburgh.

ROBERT H. FERNALD

Professor of dynamical engineering, University of Pennsylvania, Philadelphia.

EDWARD C. JONES

Chief engineer, Pacific Gas & Electric Co., San Francisco.

Managers

ELBERT C. FISHER

Vice president, Wickes Boiler Co., Saginaw, Mich.

DEXTER S. KIMBALL

Professor industrial engineering, Cornell University, Ithaca, N. Y.

EARL F. SCOTT

President, Earl F. Scott Co., Inc., Atlanta, Ga.

Treasurer

WILLIAM H. WILEY

President, John Wiley & Sons, Inc., New York.

Discuss Shop Committees

Following the talk by Professor Heilman, the meeting was thrown open for general discussion of the subject of industrial relations. George Nicoll Barnes, British representative at the recent international labor conference, Washington, pointed to the fact that the relations between employer and employe today differ from those of years ago in that the average workman is better educated than formerly and has a better grasp of current events. Mr. Barnes stated that employers should study the problem of utilizing to better advantage the intelligence of workmen. He expressed the belief that profit sharing does not appeal to workmen except under certain limited conditions.

A number of interesting types of shop committees were briefly outlined by several speakers at the morning session. According to one speaker fear of unemployment is an important factor in the present labor situation. Harry Alexander, president, Harry Alexander, Inc., New York, in discussing the subject of profit sharing briefly outlined a plan whereby workmen were given a certain rating based upon the following: Loyalty, 60 points; judgment, 15 points; ability, 15 points, and speed, 10 points. Under this system 10 per cent of profits is assigned to the workmen, but efficiency adjustments based on the ratings already mentioned determine the amounts for each. Seventy per cent of the amount devoted to efficiency adjustment is divided among two first rate men; 20 per cent among three second rate men, and 10 per cent among five third rate men. In this manner the flat profit-sharing bonus is diminished or increased by the efficiency adjustment. Mr. Alexander presented slides showing the distribution of profits according to the plan outlined by him.

Foremen Should Be Trained

Owing to the fact that lack of time prevented full discussion of all subjects brought up in the morning session, the industrial relations meeting reconvened in the afternoon. George P. Hemstreet, Hastings Pavement Co., Hastings-on-Hudson, N. Y., declared that engineers must be patient in the present situation. They must teach that production is a basic factor and that no aggregation of capital and no organization of labor can be greater than the government. Because workmen live more closely with their foremen than with any other representatives of employers it is important that foremen know their men more intimately. There should be no excuse, asserted Mr. Henstreet, for a foreman not knowing each of his men by name.

Harrington Emerson, efficiency engineer, New York, discussed the paper on wage payment presented in the morning by Mr. De Leeuw. According to Mr. Emerson, it is not feasible for employers and employes, especially in units as organized today, to fairly arbitrate their differences. Each party cannot help but feel that the other is intent upon driving a hard bargain. What is needed, declared Mr. Emerson, is a referee eminently

qualified to decide what is just. Under the present conditions there is no adequate unit of measurement and labor and capital in compromising usually do so at the expense of the public.

Another speaker called attention to the fact that distribution of goods is a factor which should be considered in conjunction with the present industrial situation. He advocated the establishment of a system of priority similar to that employed during the war which would prevent the waste effort now devoted to unessential industries.

Following this discussion, L. P. Alford, chief of staff, *Industrial Management*, again brought to the attention of the meeting a resolution which had been tabled at the early morning session. Mr. Alford explained that the document, which appears elsewhere in this article, was formulated by the New York section of the society after considerable discussion. Its adoption by the section was unanimous and it was submitted to the council of the society, which suggested that it be presented to the society at large. Following the motion a lively debate ensued, which continued until late in the afternoon. A number of speakers objected to the statement of principles on the ground that a number of terms in the last two paragraphs are vague and misleading. A number of queries were made regarding the real definition of the expression "credit capital" and a number of speakers requested an explanation of the term "intrinsic law."

The discussion was marked by considerable emphasis on detail and it was at all times apparent that with one exception all persons participating in the discussion were in hearty accord with the principles involved. It was only after the statement in question was carefully explained and questionable phrases satisfactorily amplified that the original motion, stripped of its numerous amendments, was brought to vote. Closely following the passing of this motion, another was introduced authorizing the council of the society to appoint a committee to be known as the committee on agencies of productivity to study the following: Invested savings, credit capital, organized labor, unorganized labor, employers, managers, society as a whole, and economic and productive intelligence service. This motion was quickly carried and immediately following it, another resolution committing the society to ground work plans for undertaking the task of thoroughly investigating the subject of industrial relations was considered and adopted.

Among those who participated in the discussion relative to these three motions and who were largely instrumental in passing them were E. S. Carman, chief engineer, Cleveland Osborn Mfg. Co., Cleveland; Harrington Emerson, efficiency engineer, New York; Robert Thurston Kent, New York; Frank B. Gilbreth, president, Frank B. Gilbreth, Inc., Providence, R. I.; Ira N. Hollis, president, Worcester Polytechnic institute, Worcester, Mass., and A. Ferguson, New York, who was largely resonsible for a part of the resolution adopted by the New York section.

Read Many Technical Papers

MANY different topics were discussed in the eight sessions devoted to technical subjects. Wednesday afternoon at a joint session with the American Society of Refrigerating Engineers, methods of appraisal and valuation were discussed. David H. Ray, director of laboratories, United States signal corps school, New York, presented a paper on appraisal and valuation methods in which he pointed out the injustice of some methods of valuation of public utilities now employed. M. E. Cooley, retiring president of the society, read a noteworthy paper on "Development of Project," written by the late F. B. H. Paine. In this paper the author shows that the development of project involves the conception of plan, determining of scope, preliminary design, estimate of operating expense, prospectus, development of financial plans, legal considerations, negotiations with banks and negotiations with state or other government for franchises, etc. Dean Cooley also read an abstract of a paper on "The Construction Period," by H. C. Anderson, University of Michigan, Ann Arbor. In an unusually comprehensive paper dealing with price levels and values, Cecil Elmes, Sanderson & Porter, Chicago, emphasized the importance of a knowledge of economic and exchange values for engineers. Mr. Elmes illustrated his discussion by a number of interesting charts showing comparisons of price levels and values during several critical periods in the

State Engineers' Creed on Industrial Relations

FOLLOWING is the text of the declaration of the engineers' view covering the industrial relations situation formulated by the New York section of the American Society of Mechanical Engineers and adopted by the society Thursday after an all-day session devoted to the subject of labor, employment and profit sharing:

Social and industrial unrest result from the fact that human relations have not kept step with economic evolution.

Competent directive management of essential enterprises is the logical solution. Such management must be free from autocratic control, whether by capital or by labor.

Sharp social or industrial disputes are no longer private. Society is affected, therefore such cases must be subject to the decision of authorities based upon intrinsic not arbitrary law.

Industry and public utilities must serve the people. There is no room for special privilege of capital or of labor. Strikes, irregular employment, or arbitrary acts of ownership or of management are harmful, not alone to the immediate parties but to society as a whole.

Productivity and public service are absolutely essential.

On account of the peculiarly intimate familiarity of engineers with industrial problems our responsibility is great.

Therefore, we, engineers and members of the American Society of Mechanical Engineers, declare that the following essentials are established by facts and experience, urge all of our members to uphold them, and invite other engineers to co-operate with us in having them unanimously recognized; namely:

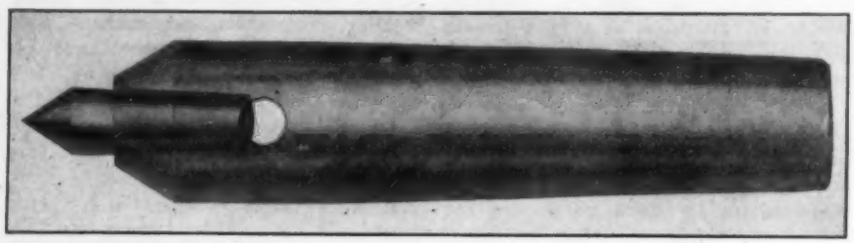
EVERY important enterprise must adopt competent productive management, unbiased by special privilege of capital or of labor, and disputes must be submitted to authorities based upon intrinsic law.

Credit capital represents the productive ability of the community and should be administered with the sole view to the economy of productive power, that is, it should be granted only to those who are able to render valuable service.

financial history of the United States.

A session on gas power was held simultaneously with the session on appraisal and valuation. E. B. Blakely, engineers, Sears, Roebuck & Co., Chicago, presented a paper describing the Hvid engine, a recently developed internal combustion unit which uses kerosene for fuel. Mr. Blakely claimed that this engine is particularly economical in the use of fuel and points out that this is important at this time when it is estimated that there are in use in this country burning gasoline nearly 4,000,000 automobiles, 250,000 trucks, 500,000 motor boats, 75,000 tractors and 750,000 farm engines.

Thursday afternoon sessions were devoted to machine tool, power machinery and textiles. The final sessions of the convention, held Friday morning, covered transportation, machine shop and general engineering topics. At the machine shop session, H. R. Trotter, S. K. F. Ball Bearing Co., Hartford, Conn., presented a paper on the lubrication of ball bearings, an abstract of which appears in this issue. H. L. Unland, General Electric Co., Schenectady, N. Y., gave an illustrated talk on electric arc welding; C. H. Bierbaum, Lumen Bearing Co., Buffalo, read a paper dealing with common errors in designing and machining bearings; and B. F. Waterman presented a paper on "Thread Forms for Worms and Hobs."



THE HIGH-SPEED STEEL CENTER MAY BE REPLACED WITHOUT REMOVING THE SLEEVE

At the general session W. E. Moore, W. E. Moore & Co., Pittsburgh, spoke on modern electric furnace practice as particularly related to foundries, and Alfred Musso, the Coast Cooling & Engineering Co., New York, presented a paper on an investigation of the strains in the rolling of metal. An abstract of Mr. Moore's paper appears elsewhere in this issue, while Mr. Musso's paper was reproduced in the issue of Dec. 4.

Confer Honor on French Engineer

The first session of the annual meeting was held Tuesday evening in the auditorium. M. E. Cooley, retiring president, delivered the presidential address in which he dwelt largely with problems confronting the society. The electing of new officers, as shown in an accompanying table, was announced. Honorary membership was conferred upon Charles de Freninville, consulting engineer, Creusot works, France, and announcement was made of the election to honorary membership of Auguste C. E. Rateau, chairman, board of directors, Rateau, Battu & Smoot Co., France. M. de Freninville has taken a prominent part in engineering in France. In response to the address made when honorary membership was conferred upon him, he stated that the world looks to America for vast production. "On my recent tour of the country," he said, "I have seen great industrial plants which have been created by the war and I saw evidences of the ability of the American people to produce manufactures of all kinds, in large quantities. Although we regard the United States is a great producing nation, a large output is not inconsistent with the highest mechanical skill. With the advantage of efficiency, machinery, and high grade tools American industrial plants are in a position to produce on a large scale, and this can be done by paying moderately high wages."

At Wednesday morning's business session the report of a joint conference committee representing the societies of civil, mining, mechanical and electric engineers was discussed. The report favors a general organization of engineers for public activities. Shortly before the war the four engineering societies organized the engineering council, a body which has represented the entire engineering profession in its public relations. It is now proposed to extend the scope of that council by creating a national organization by which the engineering and allied technical professions may become more active in their service to the public. Among the objects to be obtained are the licensing of engineers, the forming of a national service committee, the forming of a national department of public works, the conservation of national resources, and an international affiliation of engineers.

At the memorial meeting held Wednesday evening to commemorate the eightieth anniversary of the beginning of Capt. John Ericsson's work in this country, addresses were made by Rear Admiral Bradley A. Fiske, United States navy; W. A. F. Ekengren, minister to United States from Sweden; Lewis Nixon, commissioner of public works, borough of Manhattan, New York, and H. F. J. Porter, consulting engineer, New York. Speaking of the work of Ericsson, Rear Admiral Fiske said: "Weighed in the light of the results that followed, the MONITOR stands out as not only the greatest of Ericsson's achievements but as one of the greatest achievements in the progress of the human race."

Preceding the annual reunion and dance held Thursday evening, lectures on phases of aviation were delivered by Col. E. A. Deeds, chief of equipment, division of air service; and Col. Thurman H. Bane, chief of engineering division of air service, United States army. Colonel Deeds, under whose personal direction the Liberty engine was developed, spoke on the future of aviation and Colonel Bane, who is the commanding officer at McCook field, spoke on the present development of military airplanes.

During the convention a number of members and guests of the society took advantage of inspection trips to points of interest in and near New York, including the Seventy-fourth street plant of the Interborough Rapid Transit Co., the Equitable building and power plant; Brooklyn navy yard; and plant and flying field of the Curtis Airplane Co., Garden City, L. I.

Machine Tool Center Has Replaceable Point

A new center for lathes, milling machines, gear cutters and grinders has been made by the Federal Steel Co., Detroit, and consists of a high-speed steel center or point and a hardened steel sleeve. The sleeve which acts as a holder is permanent and is not subject to wear, it holding the center securely in a tapered hole.

The advantages claimed for the new center are that the high-speed steel point can be changed in about 10 seconds without removing the sleeve from the tool and that the cost of a new point is comparatively low. Being made of high-speed steel, the centers do not readily burn or wear off. The sleeves are supplied ground to any of the standard tapers.

Under the name of the Springfield Cylinder Regrinding & Piston Works, H. C. Wisenburn, of Mittineague, Mass., has started business at 343 Walnut street, Springfield, Mass.

Steel Exports Continue Decline

October Tonnage Falls to Low Figure After Slump in September—Pig Iron Exports Are Lowest Since April, 1918 as Result of the Steel Strike —Imports Also Show Falling Off

CONTINUING the slump of September, exports of iron and steel in October fell to the second lowest figure on record for this year, the tonnage for July having set the mark of smallest volume. Although a gain in imports was noticed in September when exports fell, the former also declined during October but not in an appreciable amount. Imports for the month, in fact, were the second largest during 1919, the tonnage of the previous month having set the highest figure since April, 1917.

October exports totaled 302,459 gross tons, a loss of 61,072 tons over the September shipments of 363,531 tons, and a decrease of 16.8 per cent. The latter is just double the percentage decrease of September over August. Compared with the record movement of December, 1917, when 653,344 tons were exported, the October figure represents but 46.3 per cent. Although gains were made in wire rods, structural iron and steel, hoops and bands, ship and tank plates, and barbed wire, the only one of significance was that in structural material which increased from 21,933 tons to 26,641 tons, a gain of 4798 tons. All other products suffered losses, the most severe being in steel billets, ingots and blooms, pig iron, steel rails and sheets and plates. Because of decreased blast furnace output on account of the steel strike pig iron exports with 14,108 tons reached the lowest figure since April, 1918.

Imports with a total of 40,698 tons showed a decrease of 2869 tons over the September figure of 43,567 tons. Several small gains were registered but a large loss in scrap was responsible for the decreased total. The scrap loss was 4995 tons.

Iron ore imports also dropped sharply with a total of 30,386 tons

IMPORTS AND EXPORTS
(Gross Tons)

1916	Imports	Exports
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,885	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,219
December	44,134	580,988
Total	310,891	5,947,646
1917—		
January	40,910	608,281
February	24,947	449,099
March	37,943	606,559
April	48,213	519,397
May	26,479	582,303
June	29,080	629,305
July	28,859	346,393
August	26,129	503,075
September	19,058	499,067
October	14,310	571,868
November	13,995	473,549
December	14,642	653,344
Total	324,565	6,442,240
1918—		
January	12,475	490,259
February	12,941	438,848
March	14,345	379,924
April	11,371	462,887
May	14,387	488,515
June	13,913	418,605
July	11,511	452,759
August	12,520	512,104
September	8,440	473,688
October	15,744	426,767
November	11,582	471,427
December	28,996	356,641
Total	168,225	5,372,424
1919—		
January	16,913	371,570
February	12,302	344,180
March	17,632	367,224
April	16,560	396,813
May	17,885	422,282
June	21,056	561,020
July	28,258	287,685
August	28,987	396,743
September	43,567	363,531
October	40,698	302,459
Total ten months	243,858	3,813,507

IMPORTS VARIOUS ORES AND FERROALLOYS
(Gross Tons)

	October 1919	October 1918	10 months ending October 1919	10 months ending October 1918
Ferromanganese	4,025	200	22,674	26,471
Ferrosilicon	1,601	733	7,235	2,610
Manganese ore	15,863	48,917	285,274	431,299
Tungsten-bearing ore	592	959	6,435	7,021
Nickel ore	2,536	5,803	18,672	51,385
Total	24,617	56,612	340,290	518,786

IRON ORE IMPORTS
(Gross Tons)

From—	October 1919	October 1918	10 months ending October 1919	10 months ending October 1918
Spain	....	....	54,937	15,563
Sweden	5,949	....	61,540	....
Canada	1,040	20,935	11,267	94,705
Cuba	23,397	48,437	198,805	572,414
Other countries	....	....	1,205	702	1,205
Total	30,386	70,577	327,251	683,887

IRON AND STEEL IMPORTS
(Gross Tons)

	October 1919	October 1918	10 months ending October 1919	10 months ending October 1918
Pig iron	18,381	933	72,328	31,054
Scrap	19,673	8,616	141,900	40,546
Bar iron	106	2	1,354	1,285
Ingots, blooms and billets	1,415	3,438	7,693	33,192
Structural shapes	47	182	790	2,594
Rails	590	1,196	15,256	6,762
Sheets and plates	45	5	761	1,354
Tin and terne plate	3	....	152	32
Tin scrap	386	742	4,585	5,452
Wire rods	52	438	202	7,502
Total	40,698	15,552	245,021	129,773

IRON AND STEEL EXPORTS
(Gross Tons)

	October 1919	October 1918	10 months ending October 1919	10 months ending October 1918
Pig iron	14,108	35,452	285,220	214,125
Scrap	2,335	443	17,014	2,122
Steel billets, ing. & bl'ms.	20,713	125,023	223,675	1,572,375
Wire rods	8,806	11,610	102,619	123,711
Steel rails	43,730	48,242	563,958	374,372
Steel bars	45,136	38,959	477,052	503,066
Iron bars	2,687	6,009	55,812	45,697
Struc. iron and steel	26,641	13,265	322,238	188,407
Hoops, bands and scroll	3,884	3,238	44,318	41,954
Sheets & plates	63,705	66,081	877,980	226,618
Ship and tank plts., punched and shaped	1,114	2,575	11,194	25,166
Tin and terne plate	11,939	14,420	170,169	226,055
Barbed wire	11,712	29,270	82,670	207,892
All oth. wire	16,450	13,394	170,384	132,509
Cut nails	126	152	2,678	3,354
Wire nails	5,319	6,061	81,817	64,146
All other nails incl. tacks	797	1,040	14,661	9,807
Pipes and fit'gs.	19,116	8,322	239,521	126,202
R. R. spikes	1,294	380	22,803	8,337
Bolts, nuts, rivets and wash.	2,520	2,120	35,173	22,226
Horseshoes	52	241	2,953	2,680
Cast radiators	275	161	3,769	2,013
Total	302,459	426,458	3,807,678	4,122,834

EXPORTS PIG IRON AND SEMI-FINISHED
(Gross Tons)

1916—	Pig iron	Semi-finished material
January	19,319	55,315
February	15,061	87,406
March	19,439	107,675
April	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
August	60,264	160,921
September	64,122	163,104
October	92,756	162,669
November	106,781	120,883
December	105,195	162,901
Total	607,236	1,504,563
1917—		
January	69,146	183,656
February	49,018	131,566
March	69,629	193,469
April	44,783	162,209
May	61,112	168,158
June	83,406	190,907
July	32,305	106,085
August	62,083	170,503
September	44,287	148,932
October	47,115	209,667
November	25,733	150,120
December	67,593	203,085
Total	656,210	2,018,357
1918—		
January	20,581	195,385
February	10,540	173,272
March	9,849	144,443
April	11,282	177,128
May	22,567	159,299
June	22,896	139,377
July	20,265	159,612
August	26,028	189,851
September	34,494	135,450
October	35,453	125,023
November	30,825	150,024
December	34,577	63,890
Total	269,356	1,792,754
1919—		
January	36,757	11,594
February	20,840	10,407
March	22,158	8,176
April	17,038	11,488
May	37,087	20,771
June	39,758	46,016
July	42,327	21,318
August	36,071	36,162
September	13,991	37,513
October	14,108	20,713
Total ten months	285,135	224,158

Basing Point Finding Far Away

Drawn-Out Procedure is Indicated as Federal Trade Commission Hears Arguments For and Against Pittsburgh Base on Iron and Steel—Duluth and Birmingham Support Chicago's Claims for Recognition

WASHINGTON, Dec. 9.—Months, some say years, will pass before the federal trade commission will make known its decision on the applications of steel consuming interests for elimination of the Pittsburgh base in determining the delivered price for steel. In the week just passed the commission heard 19 hours of arguments evenly divided for and against the trade practice. Under the laws governing the activities of the commission, the investigation of the subject from now on will be conducted privately and not until after the commission has formally decided to issue a formal complaint against steel producers, taking up the cause of the complaining consumers, will any of its future actions be taken publicly.

Last week's course, like practically every step before the commission so far in connection with the basing point case, was somewhat unusual in that the doors were open for any and all interests to be heard. When the hour for hearing arrived Tuesday, Nov. 2, Claude R. Porter, chief counsel for the commission, met the steel producers, the consumers and their counsel, and informally arranged to divide the time so that each side would have ample opportunity to be heard. After this was done the commissioners, who were engaged in another case, received the groups and, with slight modifications, approved the arrangements. Arguments, more or less informal, began that afternoon and continued daily until one o'clock on Saturday afternoon.

John S. Miller, counsel for the Western Association of Rolled Steel Consumers, was selected as chief spokesman for the applicants and, to the surprise of the steel manufacturers and their counsel, announced that the Birmingham and Duluth interests had joined the Chicago consumers in asking for the elimination of the Pittsburgh base and would not ask for the establishment of separate bases at Duluth and Birmingham. Later, in the course of the arguments, it was practically agreed that an order of the commission stopping the trade practice of basing prices at Pittsburgh would have the effect of making prices f.o.b. mill and during the remainder of the hearing this basis of argument was employed. The trend of the arguments, while friendly and good natured, brought out sharply conflicting theories of economics, the question being, of course, whether continuance of the trade custom or its elimination would be best for the national interest. This, as is recognized, is the point the commission has been asked to determine and large as the question is, with all its ramifications, it is apparent that much time will be required for a full investigation into the claims set up by both those favoring and opposing the practice.

When arguments were concluded last Saturday the case automatically went from the personal attention of the commissioners to that of M. F. Hudson, acting chief examiner. Under his direction every phase, and perhaps more, brought out by the hearing last week will be studied from all angles. It is likely examiners will go into every important, and perhaps some remote, steel-producing and consuming centers and into other trade points where similar trade practices are effective. This will take months and in the end what Mr. Hudson and his examiners discover will be submitted in a complete report to the commission's board of review.

This board, composed of an economist and two attorneys, of whom Adrian S. Busick is chairman and the other two are T. M. Robertson and W. T. Roberts, will act upon the examiners' report and submit it to Huston Thompson, the commissioner to whom, under the rules of the commission, the case has been assigned. With the report the board will submit a recommendation of what it believes should be done, but Commissioner Thompson is not bound to follow the recommendation in writing his opinion. This opinion, together with all data in the case, then goes before the commission which, to reach a satisfactory conclusion, may call in the board of review, voting in the end, the majority of the commissioners ruling, whether to issue a complaint and to determine against whom the complaint will be issued.

If no complaint is issued the case, will be dropped and the basing point custom will remain as it is today or, as argued by the counsel for the steel producers, until the natural laws of economics, which they said meant the growth of the Chicago producing district until it is the controling factor in the market, bring about other arrangements. If a complaint is issued, then again months will pass before an order is entered, either dismissing the

Procedure Outlined

WASHINGTON, Dec. 9.—The government's own statement of the procedure in the enforcement of the rules of law declared in both the federal trade commission act and the Clayton act, under which the steel consumers charge the producers with violations in maintaining the Pittsburgh base in establishing prices, is as follows:

"Whenever the commission has reason to believe that any person, etc., has been or is using unfair methods of competition and that a proceeding by the commission would be in the public interest, or is violating or has violated any of the aforesaid provisions of the Clayton act, it shall serve a complaint, with notice of hearing, upon such prices, etc., who shall have the right to appear and show cause why an order should not be made requiring the cessation of the violation of law charged. Other parties, for good cause shown, are allowed to intervene in the proceeding. On hearing had, if the commission shall be of opinion that a violation of the law is shown, it shall serve an order on the person complained of to cease and desist. If such person fails to obey the order of the commission, the latter may apply to the circuit court of appeals to enforce the same, and file a transcript of the record in the case. The court shall then take jurisdiction of the proceedings and have power to affirm, modify or set aside the order of the commission, but the finding of the commission as to facts, if supported by evidence, shall be conclusive. If the court permits additional evidence to be adduced it must be taken before the commission. The only review of the judgment and decrees of the court is by writ of certiorari to the Supreme Court, as provided by law. Any party required to cease and desist from a violation of law may obtain a court review in a similar manner."

complaint or compelling the steel manufacturers to "cease and desist." If the steel people refuse to obey the order the commission may take the case to the circuit court of appeals or if the steel producers prefer, they may make the appeal. From then on the matter is one for the courts.

The arguments made before the commission last week largely were along the lines of the complaints and statements made in the applications and answers filed by the consumers and producers at the invitation of the commission following its conference here last July with E. H. Gary, chairman of the United States Steel Corp., and Judge Miller, representing the western consumers. Opportunity was given for refutation of the charges and countercharges made by either side and this was readily taken advantage of. The commissioners themselves raised point after point as the hearing progressed and much of the questioning and summing up was admitted by counsel of both sides to have helped the presentations.

Those Who Argued Case

Except for two others, who spoke briefly in rebuttal for the complainants, Judge Miller at noon Saturday concluded the arguments in the case. Besides Judge Miller those spokesmen who pleaded for the removal of the trade practice were H. G. Pickering for the Superior Commercial club; Clifford L. Hilton, attorney general of Minnesota; T. T. Hudson, for the joint committee of civic organizations of Duluth; Elliott Cheatham, for the Southern Association of Rolled Steel Consumers and the Southern Association of Steel Fabricators; Charles L. Harold, secretary-manager of the Birmingham Civic association; and others, including George M. Gillett, president of the Minneapolis Steel & Machinery Co.

Richard V. Lindabury, counsel for the United States Steel Corp., opened the argument for the steel producers and was followed in turn by Henry Russell Platt for the Inland Steel Co., Frank H. Scott for the Steel & Tube Co. of America, L. A. Manchester for the Youngstown Sheet & Tube Co., C. W. Wickersham for the Lackawanna Steel Co., Paul D. Cravath for the Bethlehem Steel Co., W. A. Collings of the W. A. Collings Co., Kansas City, Mo.; James Bowron, president of the Gulf States Steel Co., and John Walsh, counsel for the Petroleum Iron Works Co. Other interests were present and represented on both sides, but the speakers were authorized to present the respective arguments of all on either side.

Arguments against the basing point were based chiefly on the theory that it is an arbitrary factor in the delivered price quoted at points where delivery requires less or no freight haul than from Pittsburgh and that by reason of that fact a large number of steel consumers are forced to pay considerably higher prices for their steel at those points than are their competitors situated closer to Pittsburgh. Elimination of this point, it was contended, would, by virtue of the demand in the Chicago district, and lower operating costs, attract producers to Chicago, perhaps to the detriment of Pittsburgh, but in response to a natural, unrestrained economic law.

Opponents of the elimination plea contended that most if not all of the Chicago producers now located there established their plants in and around that point not only because of the low cost factors, but largely because the market price in Chicago is Pittsburgh plus freight, which, also under economic laws, is a natural advantage to producers at Chicago. The opposing sides, by these arguments, brought in conflicting laws, each of which, according to the view, was the natural one and the one which should not be disturbed. It was left to the trade commission to determine which, in its opinion, is the proper one.

The steel producers' counsel stated producing mills and consuming plants have been built because of certain advantages, either the proximity of raw materials or of finished material markets, freight hauls, labor, fuel, and other factors. The consumers admitted this, but pointed out that the increase in freight rates, for example from $2.60 per ton on steel several years ago, to $5.40, at present, Pittsburgh to Chicago, restricts the territory of their output, as far as competing with fabricators in the Pittsburgh district is concerned. The real reason for the complaint, counsel for the steel producers explained, is a natural desire by all consumers for a lower price on steel and that while it may or may not reduce the cost to the manufacturing consumer, it would, if a reduction did come, go into the pocket of the fabricator and not the ultimate consumer's.

Should Serve Public Interest

The public interest in the question is a point on which the applicants dwelt with much emphasis. They argued the commission should consider this. This, the opponents of the elimination plea admitted, is of vital public interest, but, they pointed out, the public interest will be served best by a stability the basing point custom gives than by the confusion they contend will follow its elimination. The applicants charged the "stability" desired by the steel manufacturer is that of price, while counsel for the producer maintained stability of conditions in the industry is what gives and what is wanted. One of the counsel for the producers said "Pittsburgh plus freight" is to the steel trade, both producer and consumer, what the shock absorber is to the automobile.

Problem is Intricate One

It was clear as argument progressed on both sides that the deeper the commission delved into the subject the more intricate it became. The trade practices in marketing wool, cheese, butter wheat, flour and other commodities were cited by counsel and the commissioners themselves and it was stated by some that when the issue is to be finally determined the commission may have to decide for other industries as well as for steel. It may be, one member explained privately, that the commission's private examination into the question may have to take in the other industries even now in order to settle the question justly.

While Commissioner Thompson has been assigned the basing point case for his personal supervision, Victor Murdock, chairman, and William B. Colver, commissioner, sat with him during the week's arguments. The day following Mr. Murdock's elevation to the chairmanship, succeeding Franklin Fort, who resigned because of illness, Mr. Fort, appearing very wan and fatigued, sat with the commission for a few minutes. The entire group of producers, consumers, counsel, etc., arose out of respect when he entered the room.

The board of review, which will pass upon the basing point case before it again reaches the commissioners, is composed of two attorneys and an economist, of whom Adrian S. Busick is chairman. The others are T. M. Robertson, economist, and W. T. Roberts. W. R. Turner is the attorney assisting the board which will also have the help of Dr. Francis Walker, chief economist of the trade commission, whose investigations in the steel cost question are more or less familiar to the steel industry.

Among those attending the argument sessions were Willis L. King, vice president, Jones & Laughlin Steel Co.; G. H. Jones, vice president, the

Inland Steel Co.; James B. Bonner of the United States Steel Corp.; T. K. Glenn, president of the Atlantic Steel Co.; C. R. Robinson, vice president, Lackawanna Steel Co., and others, including presidents and officials of the companies which are members of the complaining associations.

Bureau Would Extend Studies of Steel

WASHINGTON, Dec. 9.—Director Van H. Manning, of the bureau of mines, in his annual report expresses the hope that congress will provide funds enough to enable the bureau to investigate iron and steel problems at its Pittsburgh station. It is pointed out that Pittsburgh is one of the great iron and steel centers of the world and that whenever the necessary funds are made available many lines of investigation can follow with results that should be of much benefit to the industry. The director says the iron industry covers a wide field and has devoted much research to the many problems within its field, hence the bureau of mines has not felt that the problems of iron and steel manufacture demanded as much attention as those of mining or of other metallurgical work. It has investigated the hazards to which workmen are exposed at blast furnaces and steel plants, it is stated, and has published the results of investigations and now it is desired to take up at the Pittsburgh station the work suggested.

Dealing with iron ores, the report says there are deposits throughout the United States which are too low grade to permit profitable smelting at present. If these low-grade deposits could be utilized, Director Manning says, the iron ore reserves of the country would be enormously increased. In order to obtain the iron from these ores the opinion is expressed that it is necessary to do one of two things: (1) Remove enough of the gangue material and impurities to bring the iron content up to the percentage required for profitable smelting, or (2) devise a commercial process for treating ores of lower grade than those being treated by present blast furnace methods.

Work on Ore Beneficiation

At present the bureau's metallurgical work on iron is centered at the Minneapolis station and is being conducted in co-operation with the school of mines, University of Minnesota, and the state mining experiment station. Individuals and corporations are said to have given attention to the beneficiation of iron ores high in phosphorus and sulphur, as well as low in iron, and at least one process has been devised that promises to be highly successful in raising the iron content and removing the phosphorus. Because of this fact, and because the work done by the Minnesota mining experiment station promises to solve the problem of washing and concentrating low grade minable ores, the bureau of mines has not attempted to begin any work on the beneficiation of low grade ores, but is giving its attention rahter to the devising of commercially feasible processes for reduction of those iron ores that are too low grade for blast furnace smelting. Evidently, it is stated, the development of successful processes for the beneficiation of low grade iron ores will assist in solving the second phase of the problem, for an ore might be too low grade for blast furnace smelting, but after beneficiation be high enough in iron for reduction by some other process. Hence, the bureau believes it is justified in studying ways and means of preventing metallic waste, in giving especial attention to new processes for the production of iron, and investigating the merits of processes already suggested.

Manganese investigations showed that in time of war a large part of the manganese needed in this country could be obtained from domestic ores, reductions in imports being met by the development of new deposits of high-grade ore, by the beneficiation of low-grade ores, and by the use of low-manganese alloys made from these leaner ores. A comprehensive bulletin on manganese, its utilization, treatment of its ores, and mining costs is in press.

Coal Crisis Demands Policy of Wisdom

—Secretary Lane

WASHINGTON, Dec. 8.—Able and timely analyses and suggestions are made by Secretary of the Interior Franklin K. Lane in dealing in his annual report with coal, electricity, and petroleum, as the three sources of light, heat and power, and the need for constructive policies affecting their production and distribution. Secretary Lane goes into these intricate problems from both a practical and scientific viewpoint and treats of the fundamentals they involve in a most illuminating way comprehensively pointing out remedies some to come through legislation the adoption of which ought to prove a great boon to industry in assuring more efficient operation, conservation and the averting of such crises as that caused by the coal strike.

Summarizing his report on the three vastly important commodities mentioned, he says:

"It would seem to be our plain duty to discover how little coal we need to use. To do this we must dignify coal by grading it in terms not merely of convenience as to size, but in terms of service as to its power. We should save it, if for no better reason than that we may sell it to a coal-hungry world. We should develop water power as an inexhaustible substitute for coal and if necessary compel the coordinating of all power plants which serve as a common territory. New petroleum supplies have become a national necessity, so quickly have we adapted ourselves to this new fuel and so extravagantly have we given ourselves to its adaptability. To save that we may use abundantly, to develop that we may never be weak, to bring together into greater effectiveness all power possibilities—these would seem to be national duties, dictated by a large self-interest."

The report begins with a discussion of the coal strike immediately after the statement that there will be a reaction against the intense industrialism of the present, "but as it must be agreed that the race for industrial supremacy is on between the nations of the world, America may well take stock of her own power possibilities and concern herself more actively with their development and wisest use."

Secretary Lane explains that "the coal strike has brought concretely before us the disturbing fact that modern society is so involved that we live virtually by unanimous consent." Less than one-half

of 1 per cent of the population of the country, it is shown, quit their work of digging coal "and we are threatened with the combined horrors of pestilence and famine." Showing what might be the state of the country in another 30 days, Secretary Lane inquires as to what is the best way of meeting the situation, seeking to learn how much coal is mined, by whom, its quality, uses, its users, how much less could be mined if conservation were practiced, what better methods have been developed for using coal, who is to blame that so small a supply is on the surface, why people should live from day to day in so vital a matter of fuel supply, and what substitutes can be found for coal and how quickly these may be available.

He makes replies to his own queries, once he has stated that if coal operators themselves had not carried over the statistical machinery developed during the war, "we would have been forced to the humiliating confession that we did not know facts which at the time were of the most vital importance."

More Knowledge is Needed

In a time of stress, it is stated, it is not enough to be able to say that the United States contains more than one-half of the known world supply of coal; that we, while only 8 per cent of the world's population, produce annually 46 per cent of all coal that is taken from the ground; that 35 per cent of the railroad traffic is coal; that in less than 100 years we have grown in production from 100,000 tons to 700,000,000 tons per annum. He says that months since congress was called upon to grant the money that the desired figures might be secured, a committee of the senate finally awoke to this need and indorsed the petition. Secretary Lane states that it is necessary for national stock-taking and that it need excite no fear of a malevonent policy of "conservation," because what is desired is a policy of wisdom in order to know our resources, their availability for immediate use, guarding against waste either through ignorance or wantonness and the prolonging of their life by invention and discovery.

The present strike, makes quite clear, perhaps for the first time, that it is not the coal in the mountain that is of value, but that which is in the yard.

Secretary Lane points out that large storage facilities have not been provided, and says a bit more foresight on the part of the public would certainly have made less sudden the present crisis. He goes into the short work-year of the miners and the reasons therefor, chief of which is "no market" and says the public must accept responsibility for the coal industry and pay for carrying it on the year around.

Secretary Lane says the government should sample and certify coal, so the public would know the kind of coal it is buying and so that coal should sell in terms of capacity to deliver heat. A bill to effect such fuel inspection, it is stated, has been drafted and will be presented to congress.

Taking up the question of saving coal by saving electricity, Secretary Lane says it is three years since congress was urged "that we should be empowered to make a study of the power possibilities of the congested industrial part of the Atlantic seaboard, with a view to developing not only the fact that there could be effected a great saving in power and a much larger actual use secured out of that now produced, but also that new supplies could be obtained from both running water and from the conversion of coal at the mines instead of after a long rail haul. A stream of power paralleling the Atlantic from Richmond to Boston, a main channel into which may run many minor feeding streams, and from which diverge an infinite number of small delivering lines—the whole an interlocking system that would take from the coal mines and the railroad a part of their present burden and insure the operation of street lights, street cars, elevators and essential industries in the face of railroad delinquencies—this is the dream of our engineers, and a very possible dream it has seemed to me; of such value, indeed, that we might well spend a few thousand dollars in studying it, not with the thought that the government would construct or operate even the trunk line, tion of the engineering and financial but that it might so attract the attenworld as to make it a reality."

After reciting accomplishments of other nations in this district, Secretary Lane says the theoretical maximum quantity of hydroelectric power that can be produced in the United States has recently been estimated by Dr. Steinmetz, who calculates that if every stream could be fully utilized throughout its length at all seasons, the power obtained would be 230,000,000 kilowatts (320,000,000 horsepower). It is clear, Secretary Lane adds, that only a fraction of this absolute maximum can ever be made available. He states that the geological survey estimates that the water-power in this country that is available for ultimate development amounts to 54,000,000 continuous horsepower. The census of 1912 showed that the country's developed water power was 4,870,000 horsepower, about 9 per cent of the maximum power available for economic development and less than 2 per cent of the total that may be supplied by the streams as estimated by Dr. Steinmetz.

Alexander's Appointment, Cause of Surprise

Washington, Dec. 9.—The senate is expected to confirm without any debate the action of the President in nominating Representative Joshua W. Alexander as secretary of commerce to succeed William C. Redfield. His nomination came as a surprise and set at rest reports that the President intended to name a business man for the position. Mr. Alexander has expressed reluctance at leaving congress, but said he would resign as soon as the senate had confirmed his nomination. Mr. Alexander has been a member of congress since 1904 and became chairman of the committee on merchant marine and fisheries in 1910.

Nelson B. Gaskill, Burlington, N. J., was nominated as a member of the federal trade commission to succeed Chairman J. Franklin Fort, who resigned owing to illness. Victor Murdock, who has been vice chairman, has automatically become chairman.

Edgar E. Clark, of Iowa, has been renominated as a member of the interstate commerce commission.

Palmer's Attitude Wins Foundrymen's Approval

Washington, Dec. 9.—Commendation of Attorney General Palmer for his attitude toward radical labor is carried in a resolution adopted by the National Founders' association at New York, Nov. 20, and which was presented through a committee from the association.

The resolution follows:

Whereas, the forces of unrest in this country, fostered by alien propaganda and abetted by union labor leaders of radical tendency, are at this time seeking the overthrow of the government of the United States, and, as a means to that end, are attempting to crush industry through widespread strikes and monopolies of labor, and

Whereas, it is fitting that all loyal citizens give encouragement by word and deed in its stand against such lawless acts,

Resolved, that we, the National Founders' association, in convention assembled, do renew our allegiance to the principles embodied in the constitution and laws of our country and do pledge ourselves to assist the government in its efforts to suppress sedition and disorder;

Resolved, further, that we, as citizens, express our deep debt of gratitude to A. Mitchell Palmer, attorney general of the United States, for his timely effort and loyal and courageous action in defense of American principles and against the disloyal and unlawful activities of the United Mine Workers of America and their allies.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

THE Reading Iron Co., Reading, Pa., manufacturer of wrought iron pipe, has been reorganized under the direction of President Leon E. Thomas. A notice of Mr. Thomas' election with a sketch of his business career was published in the March 27 issue of THE IRON TRADE REVIEW. W. Woodward Williams, who as noted in the July 24 issue of this publication, was appointed general manager of the company, succeeds George Schuhmann, who retired Aug. 1, because of ill health. The appointment of Craig Geddis as advertising manager and W. E. Dunham as production engineer, was noted in this column under date of Oct. 30. Edgar F. Blessing is metallurgical engineer.

Purchases by the company include the plant of the George B. Lessig Co., Pottstown, Pa., bringing an additional monthly muck bar capacity of 2600 tons, and 10 acres of land adjoining its tube works have been bought from the Empire Steel & Iron Co.

Important changes have been made in the sales policies of the Reading company. Branch offices for district sales representatives have been established at Philadelphia, New York, Pittsburgh, Chicago, Cincinnati and Dallas, Tex. Additional branches which now are being located, will be established in the near future.

* * *

UNDER the direction of John O'Brien and David Goldich, the Universal Bearing Bronze Co., Windsted, Conn., has started the manufacture of aluminum castings, rough and finished, in a portion of the old Goodwin & Rintz factory buildings.

* * *

TO DOUBLE its capacity the Iowa Steel & Iron Works, Cedar Rapids, Iowa, has added a new foundry building. This covers a space 72 x 140 feet, and has been equipped with up-to-date machinery. In addition several modernizing changes are being made in the office.

* * *

A HALF million dollar syndicate is being formed in Cleveland to underwrite stock of the Murray Ohio Mfg. Co. The J. W. Murray Mfg. Co. of Detroit, said to be the largest manufacturer of hoods, fenders and sheet metal parts for motor cars recently announced its intention of establishing a plant in Cleveland.

* * *

THE Model Yacht Co., Worcester, Mass., a $10,000 Massachusetts corporation, has been organized for the construction of toy ships. Henry H. Forbes is president, treasurer and general manager, with Floyd A. Ramsdell, general manager of the Worcester Film Corp., and Linwood M. Erskine, attorney, directors. The company has been organized to fill a growing demand for toy boats formerly supplied by Germany.

* * *

ORGANIZED by Frederick C. Van Derhoof, formerly general manager of the automobile department of the Standard Steel Car Co., Butler, Pa., the Bacon Motors Corp. has a capital of $1,500,000. It will build a light 6-cylinder automobile, which will be marketed next spring at a low price. The company has acquired a 21-acre site at New Castle, Pa., and a new factory, 100 x 500 feet. H. L. Archey, Philadelphia, has been named sales manager.

* * *

ANNOUNCEMENT is made of the organization of the Miller Mfg. & Machine Co., of Centralia, Wash., where the company has opened a plant at 616 North Tower avenue. W. J. Miller is president, J. G. Jones secretary and treasurer, L. B. Jones general manager and C. S. Sheldon manager. The company will have a completely equipped shop to do mill and automobile machine work, grinding cylinders, will make high-speed piston rings, and do oxy-acetylene welding.

* * *

THE largest structural job awarded in Milwaukee in several years, involving 4500 tons of shapes, was let during the week by the A. O. Smith Corp. to the Worden-Allen Co., which is now completing the erection of a 600-ton building for the same interest. The new letting is for the second unit of a plant enlargement project by which the Smith Corp. will add 400,000 square feet of manufacturing space at an estimated cost of more than $3,000,000, including a large list of machine tools and other equipment.

* * *

PROPERTY, 356 x 600 feet, in Evanston, Ill., has been purchased by the International Lubricants Co., Ltd., 350 North Clark street, Chicago. It adjoins the Mayfair cut-off of the Chicago-Northwestern railroad. The first unit of a 3-story brick and concrete building, 50 x 100 feet, now is nearing completion. All equipment, machinery, storage tanks, pumps, etc., rapidly are being installed, with the expectation that the manufacture of lubricating greases and oils will commence, shortly after the first of the year.

* * *

THE Cleveland Tractor Co., Cleveland, has entered into a contract with the government of the province of Quebec for an unlimited number of tractors. Quebec is to finance the sale of the tractors to farmers in promoting greater farm efforts.

The company has reached a production of 8000 tractors of the crawler type since it began operation four years ago. The output this year was double that of the previous year, when production was rushed to help in wartime farming. The present factory space is being doubled.

* * *

THE Billings & Spencer Co., Hartford, Conn., is to increase its capital stock from $750,000 to $1,000,000, the $250,000 to be used for an expansion of the plant. The directors of the company, at a meeting Dec. 2, elected two new officers, J. B. Sehl being promoted from assistant treasurer to second vice president, and A. W. Gray being elected to succeed Mr. Sehl as assistant treasurer. Mr. Sehl has been with the company seven years, the last three as assistant treasurer. He also is factory manager. Before going to Hartford he was manager and treasurer of the Precision Die Casting Co., Syracuse, N. Y.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

BUSINESS and property of the O. S. Walker Co., Worcester, Mass., manufacturer of grinding machines and magnetic chucks, has been sold by Oakley S. Walker to a group of men prominently connected with the machine tool and supply business. The reorganization has been completed and the new management has assumed control. The name of the company will remain unchanged. The sale includes the company's plant on Rockdale street, Greendale, Mass. The officers of the company now are: President, W. B. McSkimmon, Boston; vice president, J. H. Drury, Athol, Mass.; general manager, secretary and treasurer, Clayton O. Smith, who until recently was sales manager of the Norton Grinding Co. The third director being William F. McCarthy, Boston. Isaac F. Williams remains as manager.

The new ownership brings increased financial resources for the Walker company, which means the development and increase of the business.

* * *

RECENTLY formed at Detroit, the American Auto Parts Co. will build and operate a plant which will have an immediate capacity of 2500 tons of automobile springs per month. Most modern mechanical and heat treating equipment will be utilized and the furnaces, other heat treating equipment and power system were designed and constructed by the McCann-Harrison Co., Cleveland, engineer and contractor, and this company will supervise their installation. The building construction is being handled by the Thompson-Sterrett Co.

* * *

REORGANIZATION recently was completed by the Pittsburgh Rivet Co., Pittsburgh, by the election of the following officers: William J. Reitz, president; Jacob H. Reitz, vice president; John F. Lehrian, treasurer; and Roy A. Reitz, secretary. The company has leased a tract, 100 x 100 feet, adjoining its plant at Thirty-eighth street and the Baltimore & Ohio railroad and will erect an addition. It expects to be in the market shortly for equipment for the extension and plans to increase the number of its products by the addition of some specialties.

* * *

W. E. MOORE & CO., engineers, Pittsburgh, now are busy designing a new carbide plant for the Farmers Standard Carbide Co., Freydenburgh Falls, N. Y. A 46-foot waterfall will be developed to a capacity of 3700 horsepower. A 3-phase carbide furnace, made by the Pittsburgh Electric Furnace Corp., Union bank building, Pittsburgh, will be installed, together with crushing, screening, canmaking and packing machinery, to handle an output of 30 tons per day. W. B. Ragatz, of the Union Carbide Co., has been engaged as works manager.

* * *

THE Lumen Bearing Co., recently organized at Youngstown, O., for the erection of a plant to manufacture bearings of an improved type, has elected the following officers: William H. Barr, president and treasurer; C. H. Bierbaum, vice president; N. K. B. Patch, secretary. The officers and the following comprise the board of directors: Thomas Parrock, H. B. Parrock, Kester Barr, L. B. McKelvey, J. F. Bonnell and B. G. Parker. The company is erecting a plant, the first unit of which will be 105 x 140 feet, and expects to produce its first castings April 1, next.

* * *

CAPITALIZED at $100,000, the Pacific Iron & Steel Co., Inc., 610 Laughlin building, Los Angeles, will equip a foundry and machine shop in addition to its present steel plant. Construction will start soon on these two buildings and the company will be in the market for foundry and machine shop equipment at an early date. Included in the latter is one large boring mill, several large lathes, a few small punches, etc. Officers are: President, D. M. Ward; vice president, A. J. Anderson; secretary and treasurer, C. E. Bradburn. The plant is located at 2637 to 2665 Humboldt street.

* * *

THE Judson Mfg. Co., San Francisco, with works at Emery, Cal., about Jan. 1 will have ready for operation a new 19-inch breakdown mill and a 16-inch 5-strand bar mill, driven by an 800-horsepower motor. The mill will take from a 6 to an 8½-inch ingot. A new continuous furnace for No. 1 10-inch mill will be 125 feet long. The No. 5 mill, 5-stand, will have a hot bed 150 feet long. A 50-ton open-hearth furnace now under way will be completed shortly after Jan. 1, it is thought. The Judson company also will have a new rolling mill shortly.

* * *

THE Eastern Foundry Co., which operates a gray iron plant at Jamesburg, N. J., for casting piano plates and backs as well as other castings for musical instruments, has been incorporated with an authorized capital of $350,000. The incorporators include Thomas J. Watts, Mattawan, N. J., and William B. White, South River, N. J. The office is at 152 Main street, South River, N. J., where the company is about to erect a branch plant. It will contain about 40,000 square feet of floor space and will be devoted to piano plate and other specialties that now are produced at the company's plant at Jamesburg.

* * *

ORDERS booked during October by the Chicago Pneumatic Tool Co., Fisher building, Chicago, are stated to be in excess of any previous month since the signing of the armistice. This is true as well of the English and German subsidiaries. While the German subsidiary of the Chicago Pneumatic Tool Co., Chicago, was seized by the German government and operated by it under "compulsory administration" since the entry of the United States into the war, this now has ended and the management transferred back to the Tool company through the courts of commerce. This information was conveyed by cable recently from the company's representative now returning from Berlin. He states that the German company was well managed during the war and while it now is operating on a satisfactory basis, arrangements have been made to increase its production materially.

Plans Refinancing

Inland Steel Co. Outlines Extensive Stock Changes—Growth is Marvelous

Chicago, Dec. 9.—Preliminary steps have been taken by the Inland Steel Co. for complete refinancing and reincorporation. The recommendations of the board of directors will be presented at a special meeting of stockholders Dec. 16, when they undoubtedly will be adopted.

The Inland company now is incorporated under a Delaware charter for $30,000,000, of which $25,019,500 is outstanding. The shares have a par value of $100. New stock of $25 par value is to be issued and exchanged for old stock on the basis of four to one. The company then will be incorporated under the new Illinois law, with stock of no par value, which will be exchanged share for share for the $25 Delaware stock. The new stock will be tax exempt in Illinois. Dividends at the rate of 8 per cent a year have been paid since Sept. 1, 1915. The dividend rate on the new stock is expected to be $4 per year, which would be equivalent to 16 per cent on the present stock. The New York stock exchange will be asked to list the new issue. Present stock is now in the unlisted department of the Chicago exchange but is inactive as it is closely held and commands a high price. The Illinois corporation will have a capitalization of 1,200,000 shares, of which 1,000,780 will be exchanged for the old stock, leaving 249,220 shares to be disposed of as the board of directors decide.

The measures outlined probably will not mark the completion of Inland's new financing. Further developments will await the forthcoming decision of the Supreme court on the taxability of stock dividends as income. At the end of the last fiscal year the company had a surplus of $14,301,973, held cash and Liberty bonds in excess of $10,000,000 and reported receivables nearly $5,000,000 in excess of payables. In addition the current year's earnings have been good.

From a junk pile to one of the largest integrated units in the steel industry of the country with total resources close to $100,000,000, is the history of the wonderful growth of the Inland Steel Co. The company's spectacular rise has been due to the work and management of its builders —the Block Brothers, P. D. and L. E., and George H. Jones, who founded the company, and Alexis W. Thompson, R. J. Beatty and E. M. Adams, who joined the staff of executive officers about 17 years ago.

Starting in 1893 as a small rerolling plant at Chicago Heights, handling mostly scrap iron, the company struggled along, making headway slowly until the three prosperous steel years immediately preceding 1911. Then the capital stock had risen to $6,000,000 and the company was in such a financial position that it began to branch out. In the next two years the stock was increased to $10,000,000. Then the war greatly stimulated the company's expansion. In 1917 by a stock dividend the capitalization was raised to $30,000,000.

The company controls all materials and stages in the making of steel—iron deposits, lake vessels, coal mines, coke ovens and finishing plants at Indiana Harbor and Chicago Heights, with a capacity of more than 1,000,000 tons a year. During the period of the war a large amount of earnings was turned back into plant extensions. Still further expansion is under way. The company recently bought some 500 acres of land between its Indiana Harbor plant and Gary on which are to be erected more mills and furnaces.

Various Plants Started at Marysville, Mich.

Detroit, Dec. 9.—The Wills Automobile Co., headed by C. Harold Wills and John R. Lee, former executives of the Ford Motor Co., this city, has started building operations on its 4200-acre town site at Marysville, Mich., 52 miles north of here. The first units of the Wills motor car factory, in which an 8-cylinder automobile will be produced by next June, now are ready for structural steel. These units include the main assembly plant and a heat-treating building.

Nearby the steel work on the United States branch of the Pressed Metals Co., Ltd., of Canada, is going up while the Detroit Edison Co. is clearing ground for a $1,500,000 power and light plant.

About a dozen other industrial organizations have purchased sites in Marysville, plans for which provide for a model industrial city of wide streets, boulevards, parks and many other recreational facilities calculated to attract workmen desirous of more ideal living conditions than can be found in large industrial communities at present. Plans provide for an ore unloading dock on the St. Clair river, on which the town site is laid out, which will permit the biggest ore carriers on the lakes to discharge cargoes.

Storage Space

Of Refractory Manufacturers Filled and Some Curtailment is Forced

Pittsburgh, Dec. 9.—While shipments of refractories to the steel plants and blast furnaces have improved with the steady breaking up of the strike of the iron and steel workmen, considerable room for improvement still exists. Common labor is none too plentiful at the iron and steel plants and because of this condition shipments are going forward in no greater volume than they can be promptly handled.

A lack of specifications has resulted in considerable curtailment of brick plant activities lately, for manufacturers in a number of sections of the country continued making and piling during the first few weeks of the strike and now have no further storage capacity. Shortage of coal also is affecting production especially in the Middle West and at plants which do not own coal mines. The prices which have been in effect for several months still hold and seemingly no effort is being made to advance them.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK (First Quality)	
Pennsylvania	$36.00 to 41.00
Ohio	36.00 to 38.00
Kentucky	36.00 to 41.00
Illinois-Missouri	30.00 to 40.00
FIRE CLAY BRICK (Second Quality)	
Pennsylvania	$30.00 to 35.00
Ohio	20.00 to 25.00
Illinois-Missouri	25.00 to 30.00
SILICA BRICK	
Pennsylvania	$40.50 to 45.00
Chicago	45.50 to 50.50
Birmingham	46.50 to 51.50
MAGNESITE BRICK (Per Net Ton)	
9 x 4½ x 2½	$80.00 to 85.00
CHROME BRICK (Per Net Ton)	
9 x 4½ x 2½	$80.00 to 90.00
BAUXITE BRICK (Per Net Ton)	
55 per cent.	$ 40.00 base
76 per cent.	100.00 base

To Cast by Machine

A pig-casting machine will be installed at the Atlantic furnace of the Republic Iron & Steel Co., New Castle, Pa. The molten metal at present is cast in sand pig beds. With the completion of the pig machine, the company will be in a position to operate the Atlantic stack on merchant iron when the output is not required for other purposes.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM A. THOMAS has resigned as president of the Brier Hill Steel Co., Youngstown, O., of which he has been the executive head since the organization of the company in 1912. Mr. Thomas' resignation is to become effective Jan. 27 when the annual meeting of the board of directors is to be held. It is understood Mr. Thomas informed the board of directors at its meeting last January of his desire to retire at the end of the current year, and be relieved of executive responsibilities. Mr. Thomas' identification with the iron and steel industry dates back over a period of 20 years or more. Prior to that time he was engaged in the dry goods business for a period of about 15 years. When the American Sheet Steel Co. was organized Mr. Thomas entered the sheet business, organizing the Niles Iron & Steel Co., Niles, O. After carrying on operations under this title for about four years he and his brothers purchased the holdings of the other partners and reorganized the company with increased capital. The reorganized company was given the name of the Thomas Steel Co., and carried on expanded operations until it, with other interests, was joined with the Brier Hill Steel Co. Mr. Thomas' administration as president of the Brier Hill Steel Co. has been marked by the rapid expansion of the company's works.

Martin Stuit has been made treasurer of the Standard Malleable Iron Works, Muskego, Mich.

W. H. Lutz, for 35 years connected with the Reading Iron Co. and superintendent of its Ninth street rolling mills for many years, has resigned, effective Jan. 1, because of ill health.

Arthur H. Jones has been made Seattle sales agent for the Consolidated Steel Corp., 165 Broadway, New York City, with headquarters at 1419-20 L. C. Smith building, Seattle, recently established.

James Gilchrist has been placed in charge of the branch office established at 136 Liberty street, New York City, by Nielson & Maxwell, Ltd., Glasgow, Scotland, iron and steel merchants.

Raymond Fisher, for several years chief civil engineer of the plant of the Pittsburgh Crucible Steel Co., Midland, Pa., recently resigned to accept a position with the H. W. Johns-Mansville Co.

J. H. Creighton recently was elected secretary-treasurer of the Monongahela Iron & Steel Co., Pittsburgh, succeeding George B. Meanor Jr., who retired from the company to go into the laboratory supply business at Birmingham, Ala.

WILLIAM A. THOMAS

Joseph G. Butler Jr., vice president of the Brier Hill Steel Co., Youngstown, O., and director of the Youngstown Sheet & Tube Co., suffered a severe scalp wound and a fractured rib when he was run down by an automobile near his home, Dec. 5. Despite his 79 years he is making rapid recovery.

C. T. L. Edwards resigned as superintendent of blast furnaces of the Bethlehem, Pa., plant of the Bethlehem Steel Co., Dec. 1. Mr. Edwards entered the employ of the Bethlehem company in 1912, becoming superintendent of blast furnaces in June, 1918. He has been succeeded by G. H. Hohl, formerly assistant superintendent of blast furnaces.

Fred P. McLyar, who for the past eight years has been foreman of the hot-mill department at the Guernsey works, American Sheet & Tin Plate Co., Cambridge, O., has resigned to become superintendent of the Newton Steel Co., Newton Falls, O.

J. Ramsey Speer has resigned as president to become chairman of the board of the Pittsburgh Iron & Steel Foundries Co., Pittsburgh, and Charles McKnight, treasurer of the company, has been elected to succeed him as president. Mr. Speer served the company as vice president from 1899 to 1911, and as president from 1911 until Nov. 1 of this year. Mr. McKnight has been treasurer and a director of the company since 1899.

William M. Corse has resigned as technical superintendent of the Ohio Brass Co., Mansfield, O., to become general manager of the Monel Metal Products Corp., Bayonne, N. J. The Monel company, which specializes in monel metal and aluminum bronze castings formerly was the Bayonne Casting Co. Prior to his connection with the Ohio Brass Co., Mr. Corse was associated with the Titanium Bronze Co., Niagara Falls, N. Y., and the Detroit Lubricator Co., Detroit. In 1908 he was elected secretary-treasurer of the American Institute of Metals, now the Institute of Metals division of the American Institute of Mining Engineers, and became president of that society in 1917.

John H. Dwight, for seven years vice president and general manager of the Belle City Malleable Iron Co. and the Racine Steel Casting Co., Racine, Wis., has tendered his resignation, to take effect Jan. 1, and will join the Saginaw Products Co., Saginaw, Mich., as vice president in charge of production. The Saginaw company is a division of the General Motors Corp. Mr. Dwight went to Racine from Chicago in 1904 and with the exception of five years was associated with malleable and steel companies. For a time he was secretary of the Racine Rubber Co. and afterward manager of the wagon department of the Mitchell Motors Co., rejoining the Belle City company in 1912.

New Officers of Engineers

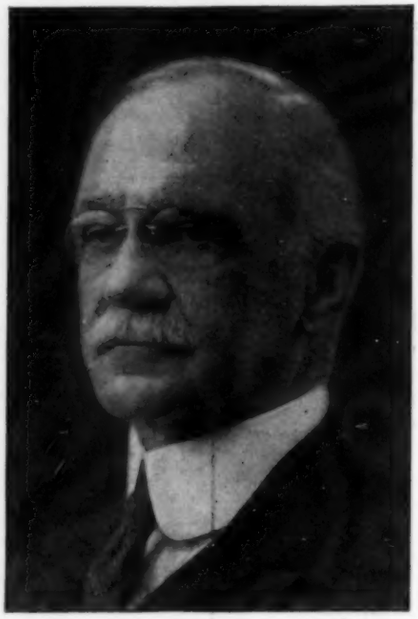
Elected at Fortieth Annual Meeting, Held at New York City, Dec. 2 to 5

FRED J. MILLER, who was elected president of the American Society of Mechanical Engineers, at its fortieth annual meeting at New York last week, succeeds M. E. Cooley, dean of schools of engineering, University of Michigan, Ann Arbor, Mich. Mr. Miller was born in Ohio in 1857. After a high school education, supplemented by personal study and special instruction, he served a 4-year apprenticeship in the machinist trade and for a number of years was employed in various capacities in machine shops.

He contributed largely to mechanical journals and finally became a member of the editorial staff of the *American Machinist*, where he remained for 20 years. The last 10 years of that period, he was chief editor and also vice president of the publishing company. After retiring from the journalistic field, Mr. Miller became general manager of a group of typewriter factories, in which capacity he served for nine years. He then was commissioned a major in the ordnance department of the United States army, being stationed during most of his service at the Rock Island arsenal. While there he organized and was at the head of the civilian service division of the arsenal. He later became attached to the office of the director of arsenals at Washington, being assigned to duty at the plant of the Bethlehem Steel Co. He then was attached to the office of the secretary of war. At present he is a member of the technical advisory committee of the war claims board at Washington.

Mr. Miller became a member of the American Society of Mechanical Engineers in 1890 and has always taken an interest in its affairs. He has served on various important committees and was a member of its council from 1904 to 1907, inclusive. He also served two terms as the society's representative on the board of the United Engineering societies, where he was chairman of three successive committees entrusted with the work of reorganizing and perfecting the Founder societies' business affairs and finances.

John Robins Allen, Robert H. Fernald and Edward C. Jones were elected vice presidents at this meeting. Mr. Allen was born in Milwaukee in 1869 and was graduated from the University of Michigan in 1892. For one year he was affiliated with the Industrial Works, Bay City, Mich., and for two years with the L. K. Comstock Construction Co.



FRED J. MILLER

He then served various educational institutions in important capacities.

Robert H. Fernald, who likewise was elected vice president, has held various professorships in educational institutions. He was instructor and assistant professor from 1893 to 1901 at Case School of Applied Science, Cleveland. From 1907 to 1912, he was professor of mechanical engineering, holding that same position from 1902 to 1907 at Washington university, St. Louis. Since 1912 he has been professor of dynamical engineering at the University of Pennsylvania, Philadelphia. Since 1910, Professor Fernald has served as consulting engineer of the fuel division of the bureau of mines, Pittsburgh.

Edward C. Jones, a third vice president, has had a prominent affiliation with the gas and electric power industry. He is now chief engineer of the Pacific Gas & Electric Co., of which he now is chief engineer.

Elbert C. Fisher who was made manager, was born in Scranton, Pa., in 1865. He was graduated from Cornell university in 1890. For one year, he was employed in the locomotive repair shop of the Delaware, Lackawanna & Western railroad, Scranton; a like period for Westinghouse-Church-Kerr & Co., Chicago, and then was manager of the Chicago office of the Murphy Iron Works. In 1895 he became associated with Wickes Bros., Detroit, and was made vice president and general manager of the Wickes Boiler Co., in 1908, a position which he now holds.

Dexter S. Kimball, also elected manager, served his apprenticeship in the shops of Pope & Talbor, Port Gamble, Wash., and the Union Iron Works, San Francisco. In 1898 he became designing engineer for the Anaconda Mining Co., and for three years served as assistant professor of machine design at Sibley college, Cornell university. He then became works manager of the Stanley Electric Mfg. Co., Pittsfield, Mass. In 1904, he returned to Cornell as professor of machine design and construction and since 1915, has occupied the chair of industrial engineering.

Earl F. Scott, a third manager elected, after serving as instructor in mechanical engineering at Vanderbilt university, was occupied with drafting and mechanical designing for several years. From 1905 to 1908, he was affiliated with A. M. Lockett & Co., New Orleans, La., contracting mechanical engineers. During that time, Mr. Scott had charge of the engineering department, designing and supervising the construction of a number of large irrigation, power and steam-heating plants. Five years subsequent to 1908, Mr. Scott had charge of the Atlanta, Ga., plant's engineering department, of the General Fire Extinguisher Co. For one year he served as assistant manager of the Atlanta office of the Griscom-Russell Co. Since 1914, Mr. Scott has been president and manager of Earl F. Scott & Co., Inc., and has designed and supervised the installation of equipment in cotton mills of the south.

Men of the Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

OAKLEY S. WALKER, who as noted in THE IRON TRADE REVIEW of Dec. 4, retired recently from the O. S. Walker Co., Worcester, Mass., founded by him and of which he was president and treasurer for a long period, has been succeeded in the former position by W. B. McSkimmon, Boston. J. H. Drury, Athol, Mass., is vice president of the reorganized company; Clayton O. Smith is general manager, secretary and treasurer. William F. McCarthy, Boston, also is on the board of directors.

Mr. Walker occupies a prominent place in American machine tool circles as a designer and manufacturer of grinding machines. In this work he was a successful pioneer and was the inventor and developer of the magnetic chuck. He was a machinist by trade and early revealed a genius for machine design. Before located in Worcester in 1886, he had manufactured drill grinding machines in a small way in Watertown, N. Y., his native city. His first three years in Worcester, were spent in the Washburn shops, where he designed and perfected a twist drill grinding machine which since has had a wide sale. From 1890 to 1897 he was employed as grinding machine designer for the Norton Co., then the Norton Emery Wheel Co., and developed various machines which have played a considerable part in the development of the business of the Norton Grinding Co.

While at work on a magnetic chuck brake, Mr. Walker observed the power magnetized metal asserts to hold to it other metal and from this evolved the magnetic chuck. When Mr. Walker established his first shop on Union street, out of which grew the O. S. Walker Co., the major portion of his time was devoted to the production of this type of chuck. Later he commenced the manufacture of grinding machines as a separate business until the shops were combined and removed to the Samuel Porter building on Union street. In 1900 the present shops were erected and the business since has been carried on in Greendale.

Clayton O. Smith, the new manager of the O. S. Walker Co., was graduated in 1892 and 1893 as mechanical and electrical engineer respectively from Worcester Polytechnic institute. He then took a student course at the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and from there went with the C. W. Hunt Co., Staten Island, N. Y. Later for five years, he was employed by the Norcross Bros. Co., Worcester, in the drafting and engineering department and became affiliated with the Norton Grinding Co., in its early days, being placed in charge of the drafting department. In 1902 he was promoted to be superintendent, in 1905 took charge of the office and in 1907 became sales manager.

Isaac F. Williams, who remains with the new company, has been manager of the business for the last four years. He was graduated from Worcester Polytechnic institute in 1897 and for a time was assistant superintendent of the Washburn shops of the institute. He entered the employ of Mr. Walker when the latter started in business for himself. His responsibilities gradually were increased until he became manager of the business.

J. E. Houck has been appointed traffic manager for the Samson Tractor Co. division of the General Motors Corp., at Janesville, Wis.

Julius Milkey has taken charge of the advertising department of Landers, Frary & Clark, New Britain, Conn.

Charles M. McNeil, president of the Utah and Chino Copper companies, has been elected a director of the American Vanadium Co.

J. H. Fellows has been placed in charge of the construction and plant engineering departments of the Stanley Works, New Britain, Conn.

E. J. Wilkie formerly connected with the sales department of the Bucyrus Co., South Milwaukee, Wis., has taken up his duties as assistant to C. N. Ballentine, southern sales manager for the company at 212 Jefferson County bank building, Birmingham, Ala.

Abram Buol, superintendent of the New Britain Machine Co., New Britain, Conn., has been elected president for two years of the New Britain chamber of commerce.

C. M. Wallace has been engaged as purchasing agent for the Standard Motor Truck Co. He was formerly connected with the Packard Motor Car Co., Detroit.

Waldo S. Reed, formerly treasurer of the Emergency Fleet corporation, has been elected treasurer of the Green Star Steamship Corp., New York.

W. H. Blake recently resigned as electrical engineer of the Charleroi, Pa., plant of the Universal Steel Co., Bridgeville, Pa., and will go into business for himself.

Milton S. Monteith, master mechanic and chief engineer of the Warren Mfg. Co., Warren, R. I., has resigned to become chief engineer for D. Goff & Sons, Pawtucket, R. I.

George E. Leighton, 136 St. James street, Montreal, consulting mining engineer, recently was elected vice president of the Samuel Osborne Co. of Canada, 145 St. James street, that city, manufacturer of steel, tools, etc.

John J. Eberhard, for the past 10 years connected with the Simonds Mfg. Co., Fitchburg, Mass., first as superintendent and more recently in charge of the hand-saw department, has resigned.

L. B. Marcy, for the past three years superintendent of the Hart & Cooley Mfg. Co., New Britain, Conn., has resigned to accept a position with the Waterbury Mfg. Co., Waterbury, Conn.

William L. Robbins, for the past five years advertising manager of the Greenfield Tap & Die Corp., Greenfield, Mass., has become sales promotion department manager of the Cowan Truck Co., Holyoke, Mass.

Ormond E. Hunt has resigned as chief engineer of the passenger car division of the Packard Motor Car Co., Detroit, to become president of the Mercer Motors Co., Trenton, N. J. He has been with the Packard organization since 1909.

Newark Makes a Bid For Foundry Convention

A meeting of the Newark Foundrymen's association, Newark, N. J., which was held Dec. 3, was participated in by the membership of the Gray Iron club and the Metropolitan Brass association, of New York. The object of the meeting was to bring the foundrymen of the Newark and New York districts closer together.

This was the first gathering of the kind ever held jointly by the three societies, and owing to its success the meeting probably will be repeated. A. E. Barlow, president of the Newark Foundrymen's association, presided, introducing Andrew N. Petersen, president of the Gray Iron club, and Frederick H. Landolt, president of the Metropolitan Brass association, who made brief addresses. It was proposed by Mr. Petersen that the 1921 convention of the American Foundrymen's association with its exhibition of foundry equipment and supplies, be scheduled for Newark or some other community in the New York district. This proposal, offered as a resolution, was adopted unanimously.

A. O. Backert, editor of *The Foundry*, was the speaker of the evening, and addressed the foundrymen on the foundry industry in France and England as seen through American eyes. Mr. Backert pointed out that whereas steelmaking capacity in this country has expanded at the rate of 10,000,000 tons a year, the pig iron production has remained almost stationary. He stated that this great demand for steelmaking iron has caused the increased prices and will continue to cause further advance. The speaker contrasted foreign with American foundry practice and enumerated the conditions which must be considered in making a fair comparison. He stated that the casting industry in France is not as large at the conclusion of the war, as it was previous to the German invasion, for the foundries gained through the accession of Alsace-Lorraine have been outnumbered by those destroyed by the enemy. In England the industry has expanded until now the foundries of that country number over 3000 active foundries.

Hold Sales Convention

About 300 salesmen, engineers and representatives of Blaw-Knox Co., Pittsburgh, attended the sales convention of that company held at Pittsburgh, Dec. 3 to 6. Discussions pertaining to all of the company's products were held and tours were made by the salesmen and representatives through the company's plant. Some of the discussions were: "Handling an Order;" "Information on Cost Keeping;" "Discussion of Knox Devices;" "Discussion of Plate and Structural Sales," and other subjects. The committee in charge of the convention was composed of Chester H. Lehman, H. B. Loxterman, Jay E. Mason, J. H. Flynn and G. E. Land.

Will Form Labor Board

Leaders in Youngstown, O., affairs are behind a plan to establish an industrial relations board for the promotion of greater amity between capital and labor.

The announced purpose of the promoters of the plan is to study the problems and grievances of employer and employe and to arrange a basis on which both can work for the best interests of the community. These leaders are understood to have approached employers and labor leaders and learned that both were favorable to ironing out any differences in such a way as to insure not only industrial peace but the complete harmony which labor and capital say is necessary to proper production and sound prosperity. Four citizens, one a manufacturer and one a labor leader are said to have signified willingness to sit on the board.

Changes Labor Policy

Washington, Dec. 9.—The United States shipping board announces that, in order to co-ordinate its labor policy and bring about a more consistent method of dealing with labor problems, all questions of labor policy affecting the construction, repair, operation, loading and unloading of ships and marine equipment, will hereafter be handled, subject to the direction of the board, through the division of industrial relations of the shipping board at Washington. Darragh de Lancey, heretofore director of the marine and dock industrial relations division, has been appointed director of the division of industrial relations.

With the return to work of a number of molders and coremakers, the strike at the plant of the Bay View Foundry Co., Sandusky, O., apparently has ended. More men are expected to seek their old jobs and all for whom places can be found will be taken back. The strike had been in progress 12 weeks.

New York Fabricators Not to Drop Open Shop

While a wage scale agreement for 1920 recently was closed between the Building Trades council, New York City and the Building Trades Employers' association, structural steel fabricators and erectors will not be a party to this contract, which had the closed shop for its feature. Under the contract as signed, union men employed on building operations where nonunion men are working are permitted to strike. Walter Drew, counsel for the Iron League Erectors' association, whose members also are members of the Employers' association, announced that his organization did not intend to abandon the open shop.

Nov. 26, 1919.

To All Architects, Owners, and Prospective Builders in Greater New York and Long Island:

Gentlemen:—As a result of the criminal records of a large number of officers and men prominent in the International Association of Bridgemen and Housesmiths, involving intimidation, violence, destruction of property by dynamite, and other crimes, the erection of structural steel work in this city and vicinity was placed on the open-shop basis on Jan. 1, 1906, and has been maintained on that basis until the present time, resulting in greatly reducing the cost of building operations and the practical elimination of strikes in the steel branch of the industry.

The contrast beween the result obtained in that industry and that resulting in other trades where members of labor unions have been recognized exclusively has been most marked, and the investing public has been the recipient of the gain.

Pressure is now being brought to bear in certain quarters to induce the members of the Iron League Erectors' Association to change this policy and adopt the unamerican policy of the closed shop.

As such a change, if adopted would inevitably result in increasing the cost of buildings, in decreasing the efficiency of our workmen, in limiting the available labor supply in this district, in causing labor strikes and delays, and would violate the rights of many of our workmen under the constitution of the United States, the members of our association, at a meeting held in the rooms of the Building Trades Employers' association Nov. 25, 1919, unanimously voted to adhere to the policy which has proved satisfactory during the last fourteen years, to employers and workmen alike.

It is the intention of our members to offer employment to all applicants having the proper requirements, without regard to their affiliation or nonaffiliation with labor unions, thereby guaranteeing to each individual his constitutional right to such employment, based only on his own ability and efficiency.

We earnestly solicit your aid in retaining the results which have been gained as set forth above, by insertion in all contracts for the erection of structural steel work of a labor clause, copies of which are inclosed herewith. Very truly yours,

Bethlehem Fabricators, Inc., Bigelow & Nichols, Commwipaw Steel Co., Donnell-Zane Co., Eidlitz & Ross, Martin R. Everett, Inc., William J. Fichter, C. H. Fox, Chr. Hafers Iron Works, Hamilton & Chambers Co., Harris Struc. Steel Co., Hay Foundry & Iron Wks., Hedden Iron Const Co., Hinkle Iron Co., Geo. A. Just Co., Lehigh Struc. Steel Co., Levering & Garrigues Co., Lucius Engineering Co., McClintic-Marshall Co., National Bridge Wks., Alfred E. Norton, Inc., Passaic Struc. Steel Co., Struc. Erecting Co., Members of the Iron League Erectors' Association.

Obituaries

LYMAN H. TREADWAY, president of the Peck, Stow & Wilcox Co., Cleveland, New York and Southington, Conn., and vice chairman of the Federal Reserve bank of the Fourth district, died Sunday morning, Dec. 7, at his residence in Cleveland. The cause of his death was heart disease and his condition was not believed to be critical until shortly before his death.

Mr. Treadway was 57 years old, having been born in New Haven, Conn., March 27, 1862. He was the son of Augustine R. Treadway, who died in Cleveland eight years ago. After his father had organized the Wilcox-Treadway Co., manufacturer of hardware and mechanics' tools, Mr. Treadway located in Cleveland in 1880. He had entered the mercantile business one year before in New Haven and when he came to Cleveland, he started as a packer in his father's plant, and learned the hardware and tool business from the ground up. The Wilcox-Treadway Co. later was incorporated into the Peck, Stow & Wilcox Co. The company's larger plant is located at Southington, Conn., where the company's centennial was celebrated on Aug. 29 and 30, of this year.

In 1911 Mr. Treadway succeeded his father as president of the company, upon the latter's resignation. While the direction of the business was his main activity, he was identified with many other interests. He was a director of the Peerless Truck & Motor Corp., and a trustee of the Western Reserve university, and was associated with various charitable, religious and civic organizations in Cleveland.

Henry Laurence Cantt, a leading industrial engineer, died suddenly at his home in Montclair, N. J., recently from an acute attack of indigestion.

Wm. E. Rice, former president of the Washburn & Moen Mfg. Co., and later connected with the American Steel & Wire Co., died in Worcester, Mass., Dec. 2, aged 86.

Jerome F. Good, aged 77, at one time superintendent of the plant of the Pittsburgh Forge & Iron Co., Pittsburgh, but latterly engaged in the real estate business, died at Pittsburgh, Dec. 1.

John A. Svenson, one of the founders and owners of the Worcester Ornamental Iron Works, Worcester, Mass., with which he has been connected the past 15 years, died at his home in that city, Dec. 4, from pneumonia, aged 54 years.

William G. Holmes, president of the Holmes Bronze Co., Bedford, O., founded by him, died on Nov. 30 in Silver City, N. M., where he had gone for his health. Mr. Holmes was

LYMAN H. TREADWAY

graduated from Ohio State university in 1904 and was a member of the Phi Kappa Psi fraternity.

Edward C. Wood, Somerville, Mass., experimental engineer, famed for work during the war, on devices for detection of submarines, died Dec. 1 of an accident at his work, aged 45 years. Most of the apparatus used during the war in submarine signaling was the result of the experimental work of Mr. Wood, and it has since been adopted as of practical commercial value in nearly every country on the globe.

William O. Oschmann, 35, electrical engineer of the Oliver Iron & Steel Co., Pittsburgh, died at the South Side hospital, Pittsburgh, Dec. 3 as a result of an accident. He was a native of Pittsburgh and resided there practically all of his life and had been connected with the Oliver Iron & Steel Co. for the past 12 years. He was a member of the American Institute of Electrical Engineers and the Association of Iron and Steel Electrical Engineers.

John F. Harrison, for many years manager of the flour and saw mills department of the Allis-Chalmers Mfg. Co., Milwaukee, died after a brief illness Dec. 4, at the age of 78 years. Mr. Harrison was especially well known as a designer and builder of flour mills, although he handled some of the largest saw mill projects in the United States. He was born in 1841 at Manchester, Eng. At the outbreak of the Civil war, he enlisted in the engineer service of the union army. At the conclusion of the war, Mr. Harrison settled in Minneapolis, where he erected some of the biggest flour mills of the present day. He came to Milwaukee in 1884 as an engineer for the Allis-Chalmers Mfg. Co., then the E. P. Allis Co., and in 1894 was promoted to the position of manager of the saw and flour mill departments.

William Ellis Rice, formerly president and treasurer of the Washburn & Moen Mfg. Co., and president and treasurer of the Worcester Wire Co., of which he was the founder, died at his home in Worcester, Mass., Dec. 2, aged 86 years. Mr. Rice retired from active business life when the American Steel & Wire Co. took over the two corporations in 1899. He was at one time one of the best known wire manufacturers in the United States. He began work in a wire mill at the age of 18 and seven years later started in business for himself with Dorrance S. Goddard, father of Harry W. Goddard, chairman of the board of directors of the Clinton-Wright Wire Co., Worcester, under the firm name of William E. Rice & Co., the plant being in Holyoke, Mass. Later it became part of the Washburn & Moen Mfg. Co. In 1870 he visited England and Sweden and was the first consumer in this country to import rolled iron direct from Swedish makers. In 1877 he organized the Worcester Wire Co., which he successfully carried on until it was merged with the American Steel & Wire Co. The Washburn & Moen Mfg. Co. and the Worcester Wire Co. now are the North, South and Central works of the American Steel & Wire Co. in the Worcester district.

U. S. Not to Aid Foreign Credits

Secretary Glass in Annual Report Sets Forth Government Policy—Demoralization of Exchanges Reflects Weak Credit Position of European Nations as Well as Adverse Trade Balance—General Financial News

BY JOHN W. HILL, FINANCIAL EDITOR

IN HIS annual report published a few days ago Secretary of the Treasury Glass dashed cold water upon the hopes of those who believe the government should participate on a large scale in further peacetime loans to the hard-pressed European nations. Instead of high commodity prices based upon the "spectre of European demand or high interest rates based upon the spectre of European credits," Mr. Glass warned that this country's fear must be that the cessation of war exports will result in closed plants, passed dividends and general depression.

Adverse Trade Balances Responsible

In a word Mr. Glass, speaking for the administration, puts it straight up to the American exporter to go out into the markets of the world and find his customers and arrange his credit terms with them, without the aid of the government. Answering the urgings of those that this government continue the flow of credits abroad to the point of stabilizing foreign exchanges, Mr. Glass makes some interesting observations the soundness of which cannot be disputed. He says:

"The artificial maintenance of the gold par of all exchanges is impossible unless we propose to level all differences in the relative credit of the nations and for our gold reserve substitute a reserve consisting of promises to pay of any nation that chooses to become our debtor. The United States has met a greater proportion of the cost of the war from taxes than any other country. Largely as a result of this the buying power of the dollar at home has been sustained better than the currency of any European belligerent. For the United States government to depress the dollar as measured in terms of foreign exchange and to improve the position of other currency as measured in terms of dollars would be to shift to the American people the tax and loan burden of foreign countries. This shifted burden would be measured in taxes, additional loans and increased domestic prices."

The secretary's views are based upon the recognition of the fact, pointed out previously by THE IRON TRADE REVIEW, but too frequently overlooked in discussions of the foreign exchange question, that adverse trade balances are not entirely responsible for the depressed exchanges. This is but one of the factors in the situation, by far the most important one being the weak credit position reflected in the astounding depreciation of the currencies of various countries. Sufficient credits to pay for all of the European purchases in this country, or enough exports to pay for all that was imported from the United States, would not bring the exchanges to par so long as the war debt had not been liquidated to some extent, and substantial deflation of the huge amounts of circulation currency and credits had not taken place. Consequently the task of bringing the exchanges to par is something that may not be accomplished with America's golden wand, unless this country is willing to lower its credit to the level of the weaker nations, an unthinkable solution.

Although the government will not make any such effort the fact remains that the treasury still has available $593,628,000 of the total of $10,000,000,000 loans authorized together with $1,000,000,000 in addition which the War Finance Corp. has been authorized to extend to aid exports. As Mr. Glass points out the power of the government to aid Europe financially is considerable. Respecting it he says that "this power must be exercised with extreme caution and with the utmost regard for the urgent needs of our own people for an ample supply of foodstuffs and other necessities at reasonable prices."

On the face of the monthly export records it would seem that American exporters have little to worry about in the exchange situation. October exports gained $35,000,000 over those for September and almost $130,000,000 over those for October, 1918. Of this gain over one year ago $90,000,000 represents increased exports to Europe where the exchange rates are carrying the heaviest burden of depreciation. From these figures many are likely to hasten to the conclusion that Europe's necessities are so urgent that she must come to America for goods at whatever price or exchange premium.

Trade Follows the Dollar

This is true to a certain extent, but eventually Europe, or that part of it with depreciated exchanges, will find a way to stop buying even necessities, unless improvement comes. Analysis of exports to Europe shows that this tendency is already in operation. The real increases in exports have been to Spain, Norway and Sweden, Denmark and Holland where the dollar is at a small premium. France is reducing her purchases at the rate of $14,000,000 a month and Italy at the rate of $11,000,000 from last year. Belgium, however, is increasing purchases and so is Great Britain, where cotton is an important factor in prosperity.

How long will present enormous exports last? No one can certainly tell but with pound sterling at a discount of 21 per cent, francs at 53 per cent and Italian lire at 60 per cent drastic curtailment of foreign buying on the part of the great European customers probably is not far distant. Long time credits and reduced prices that will in a measure absorb the shock of the exchange premium and the operation of the Edge export financing bill, expected soon to pass, are methods which may help to bring relief.

New Republic Stock May Cover Further Mills

Youngstown, O., Dec. 8.—With the issuing of 26,480 shares of common stock by the Republic Iron & Steel Co. for the purpose of providing funds for works expansion, it is thought that additional sheet mills will be built at the company's De Forest plant at Niles, O. Officials of the Republic company neither affirm nor deny that such expansion will be undertaken soon. The De Forest plant now inculdes 10 sheet mills. At the time the Republic company took over this plant, it is understood, the plans provided for the building of 30 additional mills for rolling sheets and black plate together with tin-coating equipment.

Owners of common stock on record Dec. 26 will be privileged to subscribe on the basis of one share of the new stock for each 10 shares of the old stock with provisions being made for fractional titles. The new common stock is held at $100 par and will place $2,648,000 at the company's disposal.

The present outstanding common stock of the Republic Iron & Steel Co. includes 271,910 shares of an authorized issue of 300,000 shares. The new issue, which must be paid

by Jan. 16, 1920, will increase the outstanding common stock to 298,390 shares having a par value of $29,839,000.

Crucible Picks Officers

Pittsburgh, Dec. 8.—Horace S. Wilkinson, chairman of the Crucible Steel Co. of America, was re-elected chairman and elected president of the company at a meeting of the directors in this city today. He succeeds O. H. Wharton, who declined to be a candidate for re-election as president. Dr. John A. Mathews, Syracuse, N. Y., was elected first vice president; George E. Shaw, Pittsburgh, second vice president and treasurer; John W. Dougherty, Pittsburgh, third vice president; R. H. Illingworth, Harrison, N. J., fourth vice president, and H. F. Kress, secretary.

The company under the DuPuy regime had five vice presidents, John A. Sutton, John W. Dougherty, G. W. Sargent, H. A. Brown and George A. Turville, the latter also being secretary and treasurer of the company. The number is reduced to four by today's election and John W. Dougherty is the only one of the former vice presidents who was re-elected. H. F. Kress, who succeeds George A. Turville as secretary of the company, formerly was assistant secretary and treasurer.

To Build Bar Mill

Capitalized at $500,000, the Cambridge Steel Co. has been formed and is reported planning to erect a bar mill on the site of the Interstate Iron & Steel Co.'s plant at Cambridge, O., which was damaged by fire three years ago. No other details have been made public as yet.

Scrap Firms Combine

Bishop, Friedman & Bergstrom, Inc., is the title of a consolidation just effected of the following interests: J. V. S. Bishop, Philadelphia; Ellis O. Friedman, Inc., Albany, N. Y.; V. E. Bergstrom & Co., New York; Coatesville Scrap Iron & Steel Co., Inc., Coatesville, Pa. Offices will be maintained in the Real Estate Trust building, Philadelphia; 30 Church street, New York; 82 State street, Albany, and at Coatesville.

Buys Metal Stock

Charles D. Barney & Co., Chicago, and associates have purchased voting trust certificates representing 34,644 shares of stock of the American Metal Co., Ltd., which were offered at public auction by the alien property custodian. The purchase price was $166 a share. The deal amounts to $5,310,000, and is one of the largest that has ever been negotiated by the alien property custodian. The same stock was offered at public auction on April 7, when the successful bidder was Charles Hayden of Hayden, Stone & Co. This transaction was, however, set aside. The Hayden bid was $140 a share.

Buys Pipe Foundry

John S. Tait of J. S. Tait & Co., Ltd., 500 Beatty street, Vancouver, B. C., has purchased the Vancouver Pipe & Foundry Co., Ltd., that city, and now is making cast iron soil pipe and fittings.

Sells Forging Plant

The Bethlehem Steel Co. has sold its forging plant at Titusville, Pa. Mr. Dillon, up to the time of the sale of the plant, was the general manager of the property. The plant was acquired by the Bethlehem Steel Co. from the Dillon interests about seven years ago.

Issue Oversubscribed

Youngstown, O., Dec. 8.—Official reports show that employes have oversubscribed the new issue of preferred stock of the Truscon Steel Co. The stock to the amount of $1,000,000 with a par value of $10 per share, was authorized by the directors Oct. 7.

Financial Crop Ends

The Semi-Foundry & Machine Co., of Barberton, O., has been taken over by the Frantz Foundry & Machine Co. of Akron, O., a $400,000 corporation.

* * *

The Cromwell Steel Co., Lorain, O., will redeem all of its first mortgage 7 per cent bonds at their face value plus 1 per cent premium and accrued interest at the First Trust & Savings Co., Cleveland, Jan. 1.

* * *

The Van Dorn Iron Works, Cleveland, has amended its charter placing common stock on a no par basis. New capital will consist of $2,000,000 7 per cent preferred of which $650,000 has been sold and 100,000 shares of common stock of which 80,000 will be issued.

* * *

William C. Redfield, former secretary of the department of commerce, has entered the investment security business in New York, associating himself with H. P. Wilson under the firm name of Redfield & Wilson. The firm expects to conduct reorganizations and consolidations of industrial and public utility companies.

Prices Advance

In Benzol and Toluol as Result of Curtailment by Strikes

New York, Dec. 8.—Benzol finally has advanced, the market on spot and contract business now holding at 27 to 31 cents, a rise of 2 cents in the week. Ninety per cent benzol is quoted at a 1-cent advance or 23 to 25 cents. A rise of 2 cents also is shown in toluol, the market now being 28 to 32 cents.

This advance has been expected for several weeks. Had it not been for the appearance of taking an undue advantage of the situation brought about by the steel strike, producers assert they would have advanced prices early in October, so heavy was the demand at that time. Since, the demand has continued strong, and this in conjunction with the curtailment of production brought about by the steel strike and later by the coal strike has made an exceedingly tight market. Only occasional lots of benzol are available for spot delivery, and contract shipments have been extended beyond the first half. So far have shipments been advanced that recent contract inquiry has fallen off.

Prices on sulphate of ammonia, which of late have featured the coal-tar products market, are unchanged this week. Spot domestic is quoted at $3.85 to $4, and for export $4.75 to $5 in double bags at eastern seaboard. future business is nominal.

Considerable activity is shown in naphthalin, the dye interests being good buyers. Quotations, however, are unchanged. Solvent naphtha is in steady demand at former prices.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants

Pure benzol	$0.27 to .31
Toluol	.28 to .32
Solvent naphtha	.22 to .27

Per Pound at Producers' Plants

Phenol	nominal
Naphthalin, flake	0.06½ to .07½
Naphthalin, balls	0.08½ to .09½

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.85 to 4.00

Contract

Pure benzol	$0.27 to .31
Toluol	.28 to .32
Solvent naphtha	.22 to .27

Per Pound at Producers' Plants

Phenol	nominal
Naphthalin, flake	0.06½ to .07½
Naphthalin, balls	0.08½ to .09½

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	nominal

Fair Trading in Machine Tools

New Departure Takes $1,000,000 Worth — Standard Ore Buys Heavily — Export Transactions are More Numerous—Van Dorn Iron Works Wants $100,000 Worth of Equipment—Coal Strike Effect as Yet is Normal

DEARTH of business, usually so apparent in the preholiday period, continues to hold off in the machine tool industry. In the East a considerable amount of trading is being done and inquiries are heavy in practically all districts. The New Departure Mfg. Co., Bristol, Conn., is reported to have closed on $1,000,000 worth of equipment and the Standard Oil Co. again is buying for Roumania, the award this time aggregating about $400,000 worth. It also is in the market for $90,000 worth of machine tool equipment for Mexico and Peru. It is buying considerable equipment for Toledo, O.

While export inquiries are not as numerous as two months ago, several sizable orders have been placed in addition to those of the Standard Oil Co. One Spanish shipbuilder has bought $30,000 worth of equipment. A Brazilian manufacturer closed on considerable and Brazilian railroads are inquiring, while Argentina railroads are buying. Chile is inquiring for additional locomotive cranes, although on machine tools severe competition in that country now is offered by German builders.

Eastern crane trading is somewhat restricted. The Sun Shipbuilding Co., Chester, Pa., closed on its overheads. The Eastern Potash Co., New York, the Tidewater Iron Works and the W. & A. Fletcher Co., Hoboken, N. J., each bought one. A list of overheads is expected from the Union Shipbuilding & Dry Dock Co., Baltimore while the Pennsylvania Service Corp., Philadelphia, is in the market for one. The Foote-Burt Machine Co., Cleveland, is about to close on 17 small electric cranes. In Pittsburgh, several small awards of cranes are reported. The Westinghouse Electric & Mfg. Co., inquires for 10 and the American Sheet & Tin Plate Co., asks for eight for Vandergrift, Pa.

In the Cleveland territory, dealers are active and have many inquiries. Sales are somewhat curtailed because of the approach of the inventory period, the coal strike and the fact that users' 1919 budgets for machine tool expenditure now are exhausted and they have to wait until 1920 before they can make additional purchases. Large inquiries are issued by the Van Dorn Iron Works Co., Cleveland, which wants $100,000 worth; the E. J. List Mfg. Co., Havana, Ill., the Zigler Mfg. Co., Alexandria, Ind., the Wm. H. Haskell Mfg. Co., Pawtucket, R. I. Formal lists are expected soon from the Wills Automobile Co., Marysville, Mich., the General Electric Co., Erie, Pa., the Tabor Mfg. Co., Philadelphia, and the Birdsboro Foundry & Machine Co., Birdsboro, Pa.

In Chicago, the coal strike is more of a factor than elsewhere apparently. Considerable hesitancy is manifested in ordering, but sellers state that business is not poor. The Nash Motors Corp., Milwaukee, has bought additional production equipment and the Chain Belt Co., that city, has closed on presses. Shipments to the domestic trade from the governmental warehouse at the Symington-Chicago Corp., have been delayed owing to the attention given to shipments to Belgium, which now are going forward. About 300 tools are involved.

New Departure Co. Closes on $1,000,000 List

EASTERN machine tool sellers are expressing considerable satisfaction over the volume of business now coming out. Miscellaneous inquiries are noted in good number, and buying is featured by the placing of some large orders. The New Departure Mfg. Co. is closing on a list valued at more than $1,000,000 and the Standard Oil Co. is buying considerable equipment for export to Roumania. The list had been pending for some time and in all represents approximately $400,000. In addition, the Standard Oil Co., through its subsidiaries, is in the market for about $90,000 worth of machine tool equipment for Mexico and Peru.

While exporters assert that inquiry is not what it was two months ago, they claim that actual buying has increased. In addition to the buying by the Standard Oil Co. mentioned, there have been several sizable orders placed. A shipbuilding company in Spain has awarded contracts in this country during the past week or so for approximately $30,000 worth of equipment, including some fabricating tools, and a private manufacturer in Brazil has recently closed on a considerable list of machinery. Some scattered buying has been done by the railroads in Argentina. At the present time, the Brazilian railroads are issuing small inquiries for machine tools.

In Chile, German machine tool builders are again figuring in the requirements of that country, according to American representatives. During the war, German manufacturers were black-listed. While some business has gone to Germany, machine tool builders in this country have been in receipt of some scattered orders from Chile, and recently several locomotive cranes were placed with an American builder. Chile is inquiring for additional locomotive cranes.

Trading in the eastern crane market continues rather

Ludlum

Consistently Uniform Brands

Mohawk Extra High Speed Steel	**Pompton** Carbon Tool Steel
Albany Alloy Tool Steel	**Oneida** Oil Hardening Tool Steel
Huron Alloy Die Steel	**Teton** Ball Bearing Steel
Seminole "Fool Proof" Chisel Steel	**Yuma** Chrome Magnet Steel

Prompt shipments from our warehouse stock at Watervliet, N. Y.: Detroit, Mich.; Chicago, Ill.; or Cambridge, Mass., handled thru our Branch Offices.

The Protection We Offer to You

Our immense stock assures users of ***Ludlum Tool*** Steels, prompt and dependable service of a consistently uniform product.

Manufacturers of twist drills and milling cutters are particularly fortunate in having the protection of Ludlum Steel Stock piles—for do you know that Ludlum Steels have been selected by the majority of large users and twist drill and milling cutter manufacturers as the steel best suited for their purposes?

Let us quote on your requirements.

Ludlum Steel Company

General Office and Works
WATERVLIET, N. Y.

Branch Offices:
Chicago, Cambridge, Mass., Detroit, Buffalo, New York City, Cincinnati, Cleveland, Philadelphia, Pittsburgh

restricted, although a fair amount of business is being placed. The Sun Shipbuilding Co., Chester, Pa., placed its inquiry for several overhead cranes with the Pawling & Harnischfeger Co., Milwaukee. The Eastern Potash Co., 120 Broadway, New York City, awarded a 25-ton overhead crane, with 56-foot span, for New Brunswick, N. J., to the Champion Engineering Co., Kenton, O. The Tidewater Iron Works, Hoboken, N. J., bought a 7½-ton crane, with 48-foot span, from the Bedford Foundry & Machine Co., Bedford, Ind. Another Hoboken concern, W. & A. Fletcher & Co., bought a 20-ton crane from the Ohio Locomotive Crane Co., Bucyrus, O. It is expected that a large list of overhead cranes for the Union Shipbuilding & Dry Dock Co., Baltimore, will be placed shortly through the McClintic-Marshall Co., Pittsburgh. Dwight P. Robinson & Co., 61 Broadway, New York City, consulting engineers, are inquiring for a 50-ton overhead crane for the Pennsylvania Service Corp., Philadelphia. The Eastern Foundry Co., South River, N. J., is to build a $100,000 foundry.

Coal Strike Affects Chicago Industry

WITH the coal strike causing a famine in Chicago which has led to actual closing of a majority of industrial concerns and much the same conditions obtaining in all territory west and north, a decided hesitation is evident in the buying of machine tool equipment. This intensifies the usual lull that comes on the approach of the holidays and inventory season. Yet business is by no means poor and with deliveries much delayed on the part of builders of machine tools it is difficult to place business for anything like prompt delivery. Railroads have not yet changed their attitude as to buying the tools they need.

Shipments of machinery from the government's store at the Symington-Chicago Corp. plant to Belgium are going forward, about 300 pieces being involved. This is delaying greatly the shipment of machinery to domestic users from the same source. The Nash Motors Corp. has bought further for the production equipment of its Milwaukee plant and the Chain Belt Co., Milwaukee, has bought some presses.

The American Foundry Equipment Co., Chicago, will build a machine shop. The Doehler Die & Casting Co., Chicago, is building a plant. The Ursus Motor Co., Chicago, is building the first unit of a large plant. The Crawfordsville Foundry Co., Crawfordsville, Ind., will build a foundry and machine shop.

Buyers Postpone Action Until 1920

EXHAUSTED 1919 machinery budgets of several machine tool buyers in the Cleveland territory have removed them from the market until 1920. They are telling dealers' representatives that although they need the equipment, they will not buy until after Jan. 1. The coal strike is not seriously affecting trade, although some few prospective purchasers of machinery are timid and will not close while others who do close buy one tool here and another there. It is thought this is an effort to obtain better deliveries, which for the most part on new tools are deferred many weeks. One Cleveland dealer with branches in Dayton, O., and Detroit, stated last Monday: "We have more unfilled orders on our books than at any time in our history; some of the business is booked for delivery in July and August of next year. Inquiries are plentiful and buying is frequent. If the labor situation were stabilized our large warehouse stock would be cleaned up quickly, so anxious would buyers be to obtain equipment."

One of the largest inquiries current in Cleveland is a list issued by the Van Dorn Iron Works, 3685 East Seventy-ninth street, that city. This has an aggregate value of $100,000 and the equipment is understood to be for an addition to cost $300,000. The Lakeside Forge Co., Erie, Pa., is obtaining quotations on several Bradley hammers. A large list also is expected soon from the General Electric Co., that city, in view of its recent announcement that a huge machine shop is to be built in its effort to make the Erie plant second only to the Schenectady, N. Y., works. An inquiry, current in Dayton, O., related to the automotive industry, calls for between 60 and 70 machine tools valued at between $300,000 and $400,000. The Zigler Mfg. Co., Alexandria, Ind., is in the market for several automatics, and a Cincinnati dealer, the Seifreat-Woodruff Co., is endeavoring to locate five or six inclinable punch presses, either new or used, equivalent to No. 20 Bliss, for one of its customers, who requires the equipment quickly. The Forest City Forge & Machine Co., and the Columbia Axle Co., Cleveland, are understood still to be in the market for some equipment and the B. F. Goodrich Co., is one of the Akron, O., companies which is holding off placing its orders. The Central Aluminum Co., Canton, O., has completed its addition and wants a spinning lathe and a toggle press. The Plymouth Stamped Metal Co., Plymouth, O., will require additional equipment for installation in its plant when it moves to Galion, O. The Findlay Engineering & Mfg. Co., Findlay, O., has purchased the plant of the Findlay Iron & Coal Co., to increase its output of automobiles, truck and tractor parts. It will require additional machining equipment. The Standard Oil Co. is buying crane and other equipment elsewhere than in Cleveland, for its Toledo, O., refinery which is scheduled to be the largest refinery in the world. Coal will be used for fuel since it cannot afford to use oil; the by-products, etc., it will obtain from the oil will more than pay for the coal. The Foote-Burt Machine Co., Cleveland, is about to close on its list of 17 small cranes, mentioned last week, but so far as can be learned, it has not lined up its machine tool requirements for its large new plant, now being built. Some activity is expected soon on the part of the Torbensen Axle Co., Cleveland, which recently was purchased by Willys interests at Toledo, O. The Marsh Motor Car Co., Cleveland, is endeavoring to obtain some equipment and is advertising for a second hand 20 or 30 horsepower slide valve steam engine. This company plans to manufacture passenger automobiles.

While an increase in prices shortly after Jan. 1, would not be much of a surprise in some quarters, the only advance noted recently is on one line of woodworking machinery, including spinning lathes and accessories. Effective Dec. 1, this was advanced 20 per cent.

Inquiries originating outside of the immediate vicinity of Cleveland are of interest to some sellers in that locality. The William H. Haskell Mfg. Co., Pawtucket, R. I., has issued a partial list of its equipment requirements for its new 2-story machine shop, 80 x 140 feet. It calls for one 48 x 48-inch x 12-foot and one 36 x 36-inch x 10-foot planer; one 42-inch vertical and one horizontal boring mill; one small upright and one radial drill; one tool room and one large milling machine; one large and one tool room shaper; one plain grinder; one 16-inch x 6-foot tool room and two 16-inch x 8-foot lathes, as well as pattern shop machinery and machine shop furniture. Before long the Beck & Corbitt Iron Co., St. Louis, will be in the market for electric-driven machinery as follows: Two 15-ton and one 10-ton electric traveling cranes with 75-foot span, the latter to have a lifting magnet. In addition one 84-inch plate shear for

FARRELL-CHEEK

STEEL CASTINGS

MEMBER OF
STRENGTH HONOR QUALITY SERVICE
STEEL FOUNDERS OF THE WORLD ASSOCIATION
NEW YORK, U.S.A.

The perfection of the casting depends very largely upon the core maker—

Therefore we employ masters of the art who with their skilled fingers perform miracles out of so simple a medium as sand, water and our special compound—

The same skill goes into each separate process—

Do you wonder then at Farrell-Cheek prestige?

Farrell - Cheek Steel Foundry Co.

"Makers of Steel Castings that are a little better than the next best."

Sandusky, Ohio

F·C

STAFF

Say you saw it in THE IRON TRADE REVIEW

1¾-inch plates; one 48-inch sheet shear for No. 8 or No. 10 gage sheets; one bar and angle shear, with capacity for angles up to 6 inches and up to 6 x 1-inch bars, and one cold saw and table for cutting structural shapes, also will be required. The E. J. List Mfg. Co., Havana, Ill., has issued a list which covers screw machines, drilling and grinding equipment, etc. A large list of machine tool and other equipment needs, now is in course of preparation by the Tabor Mfg. Co., Philadelphia, which has moved its plant. The Birdsboro Foundry & Machine Co., Birdsboro, Pa., placed contracts recently for a machine shop, which it will equip shortly to machine castings up to 50 tons in weight. Another list which is expected soon is that of the Wills Automobile Co., Marysville, Mich., plant of which is to be on a producing basis June 1, 1920. Representatives were in Cleveland last week calling on machinery dealers but it is understood that any inquiry issued only is tentative. Some heavy equipment doubtless will be purchased by the Connell-Erben Body Corp., Scranton, Pa., which is erecting a building to manufacture truck bodies. The Jackson Metal Products Co., Jackson, Mich., will buy additional equipment in all probability for its new addition comprising 17,000 square feet of floor space which is to double its output. Punch shop equipment will be bought by the Kent Steel Co., Scribner avenue, Grand Rapids, Mich., for its new punch shop.

Others who are expected to issue lists soon include the Cleveland Worm & Gear Co., East Fortieth street, Cleveland, which recently purchased the property fronting on East Forty-first street, immediately in the rear of its present plant; and the Crawfordsville Foundry Co., Crawfordsville, Ind.; Barnes Mfg. Co., Massillon, O.; Mead Pulp & Paper Co., Dayton, O.; Bucyrus Machine & Tool Co., Bucyrus, O.; Wm. Dennick & Co., Dayton, O.; all of whom are to build machine shops. Should the Briggs Mfg. Co., East 131st street and Taft avenue, Cleveland, commence the building of automobile bodies, in its new 6-story addition, 100 x 176 feet, it will probably require presses, etc.

Crane Business Fair in Pittsburgh

ORDERS for cranes in the Pittsburgh district bulk small in comparison with the number of inquiries which have been out for some time and those which recently have been made. The Jones & Laughlin Steel Co., Pittsburgh, recently closed with the Alliance Machine Co., Alliance, O., for a 5-ton crane for its South Side works and a 20-ton crane for its ore-roasting plant in Minnesota. The Heppenstall Forge & Knife Co., Pittsburgh, has closed for a crane with the Roeper Crane & Hoist Co., Reading, Pa., while the Pennsylvania railroad, lines west, has bought a hoist for its Crestline, O., shops from the Detroit Hoist & Machine Co., Detroit. The Canonsburg Steel & Iron Works has placed a 25-ton crane, with 5-ton auxiliary with the Pawling & Harnischfeger Co., Milwaukee.

New crane inquiries include eight mill type cranes for the Vandergrift, Pa., works of the American Sheet & Tin Plate Co., 10 cranes for the Essington, Pa., plant of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Request for bids has gone out for 17 cranes for one plant, but the identity of the prospective buyer is withheld, probably because only a few have been asked for prices and they do not want to increase competition for the business. Revised bids have been asked on the cranes for the new plant of the Follansbee Bros. Co., Pittsburgh, at Toronto, O., and as these have not all gone in yet, the award probably will be delayed. With the coal shortage slowing down industrial activity and the end of the year in sight, a quiet period appears to be immediately ahead.

Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Plants

BIDDEFORD, ME.—Plans are being drawn for a 100-foot extension to the machine shop of the Saco-Lowell Shops branch.

BELLOW FALLS, VT.—The Vermont Farm Machine Corp. has been incorporated with $1,200,000 capital to take over the Vermont Farm Machine Co., by Nathan G. Williams, James S. Williams, Glastonbury, Conn., J. A. Pearson and H. J. Searles.

BOSTON.—The Mullin Body Corp. plans a plant addition, 1-story, 170 x 560 feet, to cost $600,000.

BOSTON.—Plans are being drawn for a 1 and 2-story, 241 x 331-foot warehouse for the American Radiator Co., Chicago.

BOSTON.—The Metal Products Co. of New England has been incorporated with $90,000 capital by David H. Coolidge, Frederick H. Cowles and R. M. Russell.

BOSTON.—The American Textile Machinery corp. has been incorporated with $10,000 capital by S. F. Johnson, Bartlett Harwood and O. W. Haussermann.

BOSTON.—The Crucible Furnace Supply Co., Inc., has been incorporated with $50,000 capital by Leon L. Faux, Manfred E. Miller, Cambridge, Mass., and Thomas E. P. Wilson.

BOSTON.—The W. T. Fisher Co., Inc., has been incorporated to deal in machinery with $50,000 capital by William T. Fisher, Milton, Mass., James Wilkinson and E. J. Wilkinson.

BOSTON.—The Stone & Webster Engineering Corp. has the contract to build a 1 and 2-story, 241 x 331-foot warehouse for the American Radiator Co., Chicago. The building will cost $1,500,000.

BOSTON.—The Oil Wells Renewal Co. has been incorporated to make electrical heating appliances with $250,000 capital by P. Frederick Brine, E. M. Pollard, Cambridge, Mass., and George S. Holister.

BOSTON.—The Petroleum Heating & Power Co. has been organized with $2,000,000 capital and has taken over the Fess Rotary Oil Burner, Inc. The officers are: President, F. L. Ames; vice presidents, Robert Adamson and W. C. McTarnahan; treasurer, F. Murray Forbes.

CAMBRIDGE, MASS.—Charles M. James, 444 Main street, has plans for a factory and machine shop, 1-story, 125 x 150 feet, to cost $35,000.

EAST BOSTON, MASS.—Bids closed Dec. 8 for a 2-story and basement, 80 x 245-foot plant for the Boston & Lockport Block Co.

FALL RIVER, MASS.—The Empire Machine Works, Inc., has been incorporated with $15,000 capital by John B. Quinn, Francis J. Quinn and William T. Nickerson.

FITCHBURG, MASS.—Crocker, Burbank & Co. will build an iron storehouse.

FITCHBURG, MASS.—Bids have closed for a 2-story storehouse, to cost $75,000 for the Simonds Mfg. Co.

GARDNER, MASS.—The Gardner General Foundry Co. will build a foundry, 50 x 130 feet, to replace one burned some time ago. It will be equipped with two 5-ton and four 2-ton traveling cranes. The cupola building will be extended 40 x 46 feet.

NORFOLK DOWNS, MASS.—The Pneumatic Scale

Corp., Ltd., has let a contract for a 3-story, 70 x 150-foot office and factory building, to cost $50,000.

PEABODY, MASS.—The A. C. Lawrence Leather Co. plans a 3-story building for its mechanical department.

QUINCY, MASS.—The Bethlehem Shipbuilding Corp., Ltd., has let a contract to P. McGovern & Co., New York, for a 5000-ton floating drydock at its Fore River yard.

SPRINGFIELD, MASS.—Permit for construction of the second unit of the Stevens-Duryea Co.'s plant has been issued. The building will be 200 x 300 feet.

SPRINGFIELD, MASS.—The C. H. Smith Corp. has been incorporated to make rolls and machinery with $5000 capital by Clinton E. Bell, H. B. Lowe and V. A. Converse.

SPRINGFIELD, MASS.—The city will erect a 3-story and basement, vocational high school to contain a machine shop, tool department and sheet metal workers department.

TAUNTON, MASS.—Albert F. Lincoln & Co. have let the contract for a 1-story, 40 x 150-foot machine shop and factory, to be devoted to the manufacture of small tools.

TURNER FALLS, MASS.—Bids have closed for a one-story machine shop for the Martin Machine Co.

WILLIMANSETT, MASS.—The Stevens-Duryea Co. has let the contract for a 300 x 320-foot factory, the second unit of a 20-acre plant. The third unit will be 320 x 760 feet.

WORCESTER, MASS.—The American Steel & Wire Co. is to build a new 20 x 100 foot machine shop.

WORCESTER, MASS.—The Morgan Construction Co. has let the contract for an addition, two stories, 45 x 97 feet.

WORCESTER, MASS.—The Hobbs Lock Washer Co. is expected to be organized here soon with a capital stock of $50,000.

WORCESTER, MASS.—The Worcester Machine Works, Inc., will erect a plant next spring to contain 60,000 square feet.

WORCESTER, MASS.—The Worcester Abrasive Co. has been incorporated with $10,000 capital, by Alfred J. Pearson, Arthur C. Hedlund and O. G. Hedlund.

WORCESTER, MASS.—The Walden-Worcester, Inc., maker of wrenches, has let the contract for a 1-story, 132 x 173-foot factory and boiler house, to cost $38,000, this being the second unit of its new plant.

PAWTUCKET, R. I.—The Rhode Island Crucible Steel Co. has purchased a tract of land here and will remove its present plant to the new location.

PROVIDENCE, R. I.—The R. I. Body Co. has been incorporated to build vehicle bodies with $10,000 capital by Phillip Harris, Hyman Sarkin and Abraham Luff.

PROVIDENCE, R. I.—The Master Tool Co. has been incorporated to make tools with $25,000 capital by Joseph Duplessie, Henry C. Hart and William D. Grady, Woonsocket, R. I.

BRIDGEPORT, CONN.—The Star Auto Machine Co. has been incorporated with $5000 capital by Soren Rosenbeck, D. E. Rosenbeck and F. E. Hubbs.

BRIDGEPORT, CONN.—The Crane Co., Chicago, has let a contract to the Stone & Webster Engineering Corp., Boston, for a 3-story, 80 x 500-foot combined manufacturing and foundry building at its west end plant.

DANBURY, CONN.—The Ball & Roller Bearing Co. will build a 2-story, 50 x 75-foot addition.

HARTFORD, CONN.—The Whitney Machine Co. contemplates a plant at an estimated cost of $82,000.

HARTFORD, CONN.—Bids have closed for a 98 x 194-foot factory to cost $65,000, for the Hartford-Fairmount Co., builder of machinery.

HARTFORD, CONN.—Reconstruction of the Hartford Rubber Works division of the United States Tire Co. has recently been announced by C. B. Whittlesey, president of the local plant.

HARTFORD, CONN.—The Merrow Machine Co. has recently purchased property, and although officials of the company have made no definite statement, it is understood that a factory addition will be erected.

HARTFORD, CONN.—The L. & L. Automobile Accessories Corp., has been formed here to manufacture automobile parts. The capital stock is $25,000. The incorporators are Lewis L. Libby, Florence L. Libby, and Joseph Albani.

MERIDEN, CONN.—Wolfs Abrasive Wheel Co. has been incorporated with a capital of $400,000.

MERIDEN, CONN.—The Manning Bowman Co., nickel and silver plated ware, has let the contract for a 5-story, 50 x 130-foot factory addition.

NEW BRITAIN, CONN.—The Eastern Malleable Iron Co. will erect a building.

NEW BRITAIN, CONN.—The Fafnir Bearing Co. has let a contract for a 51 x 137-foot addition to cost $97,000.

PHILLIPSDALE, R. I.—The Washburn Wire Co. has been incorporated with $1,500,000 capital, by Albert R. Palmer, Madison, N. J., Frank R. Serles, East Orange, N. J. and George F. Handel, New York.

THOMASTON, CONN.—Bids have closed for a 3-story and basement, 90 x 100-foot factory to cost $40,000 for the Waterbury Jewell Co.

WATERBURY, CONN.—The Manufacturers Foundry Co. will build a 100 x 153-foot addition.

WATERVILLE, CONN.—The American Pin Co. is considering plans for a 4-story building.

North Atlantic States

ALBANY, N. Y.—The Cox Brass Mfg. Co. plans a factory buildnig, 2-stories, 38 x 46 feet.

ALBANY, N. Y.—The White Service Station & Motor Co. plans a salesroom and machine shop.

ALBANY, N. Y.—B. Hennessey has had plans drawn for a machine and repair shop, 1-story, 124 x 153 feet.

BATH, N. Y.—The property of the Bath Machine Works Co., which has not been operated for sometime, has been purchased by R. H. Hood, of Rochester N. Y.

BATH, N. Y.—The United States Hammered Piston Ring Co., Inc., machine shop and foundry, has been incorporated with $25,000 capital, by U. H. Frey, J. C. Frey and J. S. Frey, Hammondsport.

BROOKLYN, N. Y.—The Couch Haas Motors Corp., 1537 Bedford avenue, plans a factory building, 2-stories, 80 x 185 feet.

BROOKLYN, N. Y.—The Bay Machine Co. has been incorporated with $50,000 capital, by J. A. Clymes, T. E. Shea and P. J. McGrath, 145 East Eighty-second street.

BROOKLYN, N. Y.—The American Macaroni Dies, Inc., dies and metal plates, recently was incorporated with $5000 capital, by A. Battista, P. Gardone and O. Scallisi, 930 Fifty-sixth street.

BUFFALO.—The Guilford Mfg. Co., 225 Guilford street, has had plans drawn for a boiler room.

MIDDLETOWN, N. Y.—T. E. Reinhalter Corp., machine shop, recently was incorporated with $50,000 capital, by D. E. Stuart, W. L. Maguire and Peter Reinhalter.

NEW YORK.—The Wilkie & Carbonic Gas Co. plans a power house.

NEW YORK.—This city plans alterations to a boiler plant at Blackwells Island.

NEW YORK.—The J. L. Mott Iron Works, Inc., has had plans drawn for alterations to its plant.

NEW YORK.—The Pan American Iron Works, Inc., recently was incorporated with $10,000 capital, by M and A. Horowitz and J. Bond, 515 East 138th street.

NEW YORK.—The Presto Gas & Blower Iron Mfg. Co. has been incorporated with $10,000 capital, by J. Kornbluh, T. Podelsky and L. Pivnik, 75 East 111th street.

NEW YORK.—The Independent Gas & Electric Fixture Co. has been incorporated with $15,000 capital, by H. Goldberg, I. and R. Clar, 523 East 149th street.

NEW YORK.—The Climax Smelting & Refining Co. recently was incorporated with $10,000 capital, by S. Blumenfeld, A. Miller and M. Yockers, 1 Madison avenue.

NEW YORK.—The Begley Mechanical Corp., electrical devices, has been incorporated with $300,000 capital, by W. J. Begley, E. W. Ernst and F. P. Hennessy, 200 West Twenty-third street.

NEW YORK.—The Acetylene & Electric Welding Machine Co. has been incorporated with $11,000 active capital, by R. E. Polhemus, L. Scheuer and S. Dannenberg, 407 East Fiftieth street.

NEW YORK.—The Standard Button Machine Co., machinery and tools, recently was incorporated with $100,000 capital, by J. E. Griswold, H. P. Livermore and A. P. Nevin, 30 Church street.

ROCHESTER, N. Y.—The American Laundry Machine Co. plans a machine shop, 2-stories, 161 x 198 feet.

SYRACUSE, N. Y.—Plans have been completed for the organization of the Franklin Die Castings Corp., with a capital of $1,000,000. Howard L. Franklin, brother of H. H. Franklin, president of the H. H. Franklin Mfg. Co., is to be president; Helbert C. Skinner and C. E. Hull, vice president, and secretary and treasurer, respectively. It is the intention of the company to erect or acquire a new plant.

UTICA, N. Y.—The Muson Mill Machinery Co. contemplates a factory building, 2-stories.

WHITEHALL, N. Y.—The Adirondack Machine Co. recently was incorporated with $20,000 capital, by J. J. Doran, D. E. Brett and E. M. Finch.

BIRDSBORO, PA.—The Birdsboro Foundry & Machine Co. has placed contracts for an extension to its machine shop, 60 x 187 feet.

ERIE, PA.—The Erie Art Metal Co. will build an addition, 120 x 190 feet.

FREELAND, PA.—The Freeland Chamber of Commerce is to aid the Freeland Foundry & Machine Co., whose plant was damaged by fire some time ago.

IRWIN, PA.—The Pittsburgh Reflector & Illuminating Co., Pittsburgh, will build a plant here.

NEW CASTLE, PA.—The Bacon Motor Corp. has been organized with $1,500,000 capital to manufacture passenger cars, and has purchased a 21-acre site here on which it plans to erect a plant. F. C. Van Der Loof, Butler, Pa., formerly in charge of the automobile department of the Standard Steel Car Co., is president and F. W. Bacon, this city, is vice president.

PHILADELPHIA.—Work will be undertaken at once by the Wicaco Screw & Machine Works on a one and 2-story factory addition, 82 x 206 feet.

PHILADELPHIA.—A total of $2,500,000 will be expended by the Philadelphia Electric Co. on a power house. The building will be 1-story, 130 x 197 feet.

PHILADELPHIA.—The Philadelphia Storage Battery Co. has awarded the Stewart Bros. Co. a contract for a 3-story plant addition, 50 x 219 feet, with an ell, 26 x 50 feet.

PHILADELPHIA.—The Standard Tin Foil Corp. has awarded a contract to the Orson Co., for a $200,000

factory building. The structure will be 2-stories, 130 x 260 feet.

PHILADELPHIA.—The Wright Roller Bearing Co. has awarded the general contract for a $10,000 plant addition to the H. John Homan Co. Plans call for a building 1-story, 50 x 80 feet.

PITTSBURGH.—The Macbeth-Evans Glass Co. has let the contract for a machine shop and pattern shop.

PITTSBURGH.—The Mayer Wagon Co. plans a plant addition, 3-stories, 40 x 112 feet, to cost $50,000.

PITTSBURGH.—The Conley Car Co., tank cars, recently was incorporated with $25,000 capital, by Joseph H. Holmes, F. C. Conley and John O. Burgwin.

PITTSBURGH.—The Green River Gas Co. has been incorporated with $100,000 capital, by J. Hartman Jr., W. P. McNellie, H. J. Gallagher, H. Adams and J. Cheuvront.

READING, PA.—Part of the Orr, Painter & Co.'s Reading Store Works recently was damaged by fire.

READING, PA.—A. Lincoln Frame, 403 South Fifth street, plans an addition to his foundry, 60 x 92 feet, to cost $22,000.

READING, PA.—The Gray Iron Foundry Co. has placed a contract for a foundry extension to cost $22,000. A. L. Frame is president.

READING, PA.—The Birdsboro Steel Foundry & Machine Co. has placed contracts for an addition to its machine shop. The building will be 60 x 187 feet.

SHARON, PA.—The Savage Arms Corp. will build a $50,000 plant and a power house.

JERSEY CITY, N. J.—The Drop Forge Co., Westside avenue, has let a contract for a 4-story plant to cost about $50,000.

JERSEY CITY, N. J.—The American Platinum Works, 231 North Jersey Railroad avenue, plans a factory and boiler house.

MILLVILLE, N. J.—The Millville Cast Iron Products Co. plans a foundry, 50 x 150 feet, and other improvements.

MONTCLAIR, N. J.—J. D. Mackridge, Inc., 21 Greenwood avenue, has been incorporated with $100,000 capital to manufacture motor vehicles and motors, by Robert Kayser, John and Florence C. Sulzberger.

NEWARK, N. J.—Work will begin in the spring on a factory building for the Aeolian Co.

NEWARK, N. J.—The Seton Leather Co. plans a factory building and boiler house to cost $40,000.

NEWARK, N. J.—The Rubber & Celluloid Products Co., 55 Ferry street, has plans for a boiler and pump house.

NEWARK, N. J.—A 46 x 57-foot boiler house and engine room will be erected at the plant of Kaltendach & Stevens, Inc.

NEWARK, N. J.—The Simon-Gartler Corp. has been incorporated with $125,000 capital to manufacture skylights, cornices, sheet metal structures, etc.

NEWARK, N. J.—The Tanners Machinery Co., 42 Kent street, has been incorporated with $100,000 capital, by Anna B. Spiegel, James Brown and Charles J. Hanke.

NEWARK, N. J.—Plans are being considered by the Autocar Co., Ardmore, N. J., for a large service station and distributing plant in this city. It is stated that the building will be 1-story, 200 x 412 feet.

NEWARK, N. J.—The American Writing Machine Co., a subsidiary of the Remington Typewriter Co. has acquired the building at Central avenue and Fourth street, to which it will remove the equipment at its present plant on Mulberry street.

NEW BRUNSWICK, N. J.—The Middlesex Motors, Inc., 175 Smith street, Perth Amboy, N. J., recently was incorporated with $30,000 capital, by Leo B. Wolfe, Edward Miller and Frank Stas.

PHILLIPSBURGH, N. J.—The Hull Battery & Ignition Co. has been incorporated with $70,000 capital, by R. N. Fulton, G. T. Hull and J. M. Cady.

SOUTH RIVER, N. J.—The Eastern Foundry Corp. has been incorporated to manufacture piano plates, etc.

SOMERSET, MD.—The plant of the Somerset Highland Foundry Machine Co. recently was damaged by fire. The loss has been estimated at $30,000.

In The South

CLARKSVILLE, TENN.—The Red River Co. has been incorporated with $100,000 capital to mine minerals and manufacture pig iron, by H. N. Leech, Graham Macfarlane, L. C. Nesbet and Callis Tate.

KNOXVILLE, TENN.—The Dixie Machinery Co., Inc., recently was incorporated with $10,000 capital, by E. W. Gillespie and others.

MEMPHIS, TENN.—The Liberty Cotton Chopper Co. has been incorporated with $100,000 capital, by F. R. Hansell and others.

MEMPHIS, TENN.—The Memphis Leland Lock Co. has been organized to manufacture automobile locks, by Frank B. Folsom and others.

NASHVILLE, TENN.—The York Starter Co. has been incorporated with $25,000 capital, by W. L. York, B. U. Taylor, O. R. York, J. F. Shaw and others.

SOUTH PITTSBURG, TENN.—The South Pittsburg Foundry Co. is reported planning a plant addition, 50 x 200 feet.

CHARLOTTE, N. C.—Alexander & Garsed, cotton-mill machinery, plans a building to cost $10,000.

FAYETTEVILLE, N. C.—A $200,000 woodworking plant will be erected here by the Jackson Bros. Co.

HIGH POINT, N. C.—The Bar Spring Co. recently was incorporated with $125,000 capital, by John H. Welborn, William H. English and others.

KINSTON, N. C.—The Kinston Iron & Mantel Works will erect two buildings, 50 x 80 feet and 40 x 60 feet.

TARBORO, N. C.—The Eclipse Harrow Mfg. Co. has been incorporated with $100,000 capital, by M. G Mann, T. T. Thomas and M. S. Brown.

COLUMBIA, S. C.—The Whitton Air Jack Co. has been incorporated with $10,000 capital, by W. B. Whitton and others.

FLORENCE, S. C.—The Eagle Machine & Mfg. Co. recently was incorporated with $20,000 capital, by L. W. Broadfoot and others.

AMERICUS, GA.—The W. H. Sawyer Sons Co. plans to rebuild its plant which was damaged by fire to the extent of $75,000.

ATLANTA, GA.—The Railway Lock Spike Co. recently was organized with $300,000 capital, by J. F. Pickard, H. E. Harris and R. R. Lanham.

SAVANNAH, GA.—J. F. and J. E. Weeks will equip a plant for the manufacture of metallic caskets.

BESSEMER, ALA.—The Beggs Foundry Co. recently was incorporated with $3000 capital, by Oscar Cochranel, P. J. Beggs and others.

BIRMINGHAM, ALA.—The Birmingham Machine & Foundry Co. plans a machine shop addition.

BIRMINGHAM, ALA.—The Vulcan Rivet Co. recently was incorporated with $75,000 capital and contemplates enlarging a plant which it has taken over.

GREENVILLE, MISS.—The Riverside Transmision Co. recently was incorporated with $7000 capital, by R. B. Claggett and others.

JACKSONVILLE, FLA.—The Southern Automatic Machine Co. recently was incorporated with $10,000 capital, by R. H. Tresca and others.

SHREVEPORT, LA.—The Acme Oil & Drill Co., J. D. Pace president, is equipping a plant for turning out its products including drop forging equipment, heating furnaces and power hammers.

Throughout the West

MINNEAPOLIS.—The Russel Grader Mfg. Co. plans a factory and warehouse, to cost $75,000.

MASON CITY, IOWA.—The Mason City Foundry & Machine Co., recently was incorporated with $30,000 capital, by R. E. Wilcox, L. G. Dreyer and others.

WATERLOO, IOWA.—George B. Miller & Sons contemplate a plant to include a foundry.

ST. LOUIS.—Henry P. Mueller, 215 Lombard street, has plans for a foundry, to cost $100,000.

ST. LOUIS.—The Standard Stamping Co., 200 North Broadway, is reported planning a machine shop, 1-story, 24 x 41 feet, to cost $10,000.

ST. LOUIS.—John Nauman, care of the Urizda Realty Co., 4012 Choteau avenue, contemplates an automobile accessory plant, to cost $40,000.

ST. LOUIS.—The Wagner Electric Co. will build an additional plant five stories, 60 x 400 feet, with two wings each 60 x 60 feet, costing $44,000.

AUSTIN, TEX.—The Paris-Hugo Bridge Co., capitalized at $100,000, will build a bridge across Red river near Arthur City, Tex. E. M. McGlasson is one of the incorporators.

DALLAS, TEX.—Work of laying the ofundation for the new Dallas Machine & Locomotive Works has been started. The plant will be built at an estimated cost of $35,000.

EASTLAND, TEX.—The Howard Tool Works has been incorporated with $50,000 capital, by D. M. Howard, P. S. Wolfe and H. L. Durlin.

RANGER, TEX.—The Crescent Sheet Metal Co. recently was incorporated with $10,000 capital, by F. E. Skinner, W. E. Skinner and A. M. Fitzgerald.

CARNEGIE, OKLA.—An election will be held Dec. 16 on $24,000 in bonds for waterworks extensions.

OMAHA, NEBR.—The Carter Sheet Metal Works, 108-12 South Tenth street, is reported planning a plant, 1-story, 132 x 162 feet, to cost $20,000.

SIOUX FALLS, S. DAK.—An election will be held Dec. 9 to issue $375,000 in bonds for waterworks construction and $175,000 for a sewer system.

DEVILS LAKE, N. DAK.—The Northwestern Iron Works contemplates a plant to include a machine shop, foundry, pattern shop, tin shop, blacksmith shop, etc.

ORNICO, NEV.—The 100-ton mill of the Olympic Mines Co. recently was damaged by fire. The loss has been estimated at $70,000.

PHOENIX, ARIZ.—Bids will be taken soon for a pipe line to cost $1,000,000. H. J. Phillips, St. Louis, is consulting engineer.

Central States Activity

JANESVILLE, WIS.—The Samson Tractor Co., now erecting a large foundry, has announced plans for two others of similar dimensions.

MILWAUKEE.—The Atlas Foundry Co. will erect a plant addition, 80 x 80 feet, at an estimated cost of $20,000.

MILWAUKEE.—The Gemco Mfg. Co., G. F. Disher president, 742 South Pierce street, will build a plant costing $50,000.

MILWAUKEE.—The Worden-Allen Co. has the contract to construct new buildings for the Newport Co. manufacturer of coal tar products.

MILWAUKEE.—The Nordberg Mfg. Co., engines and pumping equipment, has awarded contracts for a 1-story machine shop addition, 100 x 120 feet, to cost $100,000.

MILWAUKEE.—Contracts have been awarded by the Milwaukee Auto Engine & Supply Co. for a 1-story machine shop, 120 x 120 feet, costing $45,000 without machinery.

MILWAUKEE.—The Mid-West Electric Co. has been incorporated with a capital of $50,000 by David, Louis and Anna Cohen to manufacture and deal in electric-motored domestic and industrial appliances.

MILWAUKEE.—The Stowell Co., manufacturer of hardware specialties, has acquired the foundry of the Pelton Steel Co. at Chicago road and Elliot place, and will convert it into a malleable iron unit.

MILWAUKEE.—The Pelton Steel Co. has sold its plant to the Stowell Co., manufacturer of steel and iron castings. It is said the plant will be operated by the purchaser as a branch malleable iron foundry.

RACINE, WIS.—The American Skein & Foundry Co. will enlarge its plant by an addition, 100 x 250 feet.

RACINE, WIS.—The Walker Mfg. Co. has broken ground for a foundry, 120 x 128 feet, to be equipped for light gray iron casting work. The company makes automobile jacks and other accessories.

RACINE, WIS.—Becker, Menzel & Becker, consulting engineers, Baker building, are preparing specifications for improvements in the steam power plant of the Higgins Spring & Axle Co., and also for the Sheboygan (Wis.) Fruit Box Co.

SHEBOYGAN, WIS.—The Globe Metal Products Co. is erecting a foundry and cupola building at an estimated cost of $50,000.

ALPENA, MICH.—The General Engineering Co., John Lundberg, president, will erect a foundry and machine shop, 70 x 80 feet.

BATTLE CREEK, MICH.—Two hundred acres have been acquired for expansion of the Grand Trunk railway machine and repair shops here.

BATTLE CREEK, MICH.—The Advance Pump & Compressor Co. is erecting a foundry, machine shop, power house, testing room, blacksmith shop and warehouse, which will double its capacity.

BENTON HARBOR, MICH.—Plans have been prepared for a foundry addition for the Superior Steel Co. to cost $200,000.

CADILLAC, MICH.—Ground has been broken for the first unit of the new plant for the Kol-Ben Wheel Co. It will be 48 x 156 feet.

DETROIT.—The Gray Motor Co. plans a plant addition, 60 x 160 feet.

DETROIT.—The Commerce Motor Car Co. contemplates a plant addition.

DETROIT.—The Timken-Detroit Axle Co. has let a contract for a second story addition.

DETROIT.—The Hupp Motor Car Corp will erect a power plant and factory at Jackson, Mich.

DETROIT.—The Cut Tap & Die Co. plans a factory and office addition, 1-story, 40 x 48 feet, to cost $15,000.

DETROIT.—Architect Albert Kahn is taking figures on the machine shop unit of the new Paige-Detroit Motor Car Co. plant.

DETROIT.—The McCord Mfg. Co., manufacturer of auto parts, has purchased the plant of the Racine Mfg. Co., Racine, Wis.

DETROIT.—The Krukow Process Tool Co. has been chartered with $20,000 capital and will operate a machine and tool shop.

DETROIT.—Edmunds & Jones Corp., manufacturer of auto lamps, plans extensive plant additions. George E. Edmunds is president.

DETROIT.—The Star Tool & Die Works has been incorporated with $15,000 capital, by Herbert Chartier, 716 Lakewood boulevard, and others.

DETROIT.—The Peninsula Forging, Die & Tool Co. has been chartered with $10,000 capital, by George F. Daschke, 193 Woodward avenue and others.

DETROIT.—The Detroit Weatherproof Body Co. has acquired additional space at Corunna, Mich., for the manufacture of limousine bodies. Other buildings will be erected later.

DETROIT.—W. P. Fleming, Inc., has been chartered with $15,000 capital to manufacture garage equipment and machinery, by F. R. Dentz, 225 Elmhurst avenue and others.

DETROIT.—The Continental Trailer Corp. has been chartered with $50,000 capital to manufacture auto trailers, trucks, etc., by Thomas Steiner, 1499 Townsend avenue, and others.

FILER CITY, MICH.—The Manistee Drop Forge Co. is erecting a new building.

HOLLY, MICH.—The Ground Hog Tractor Co. has been organized with $250,000 capital to manufacture farm tractors. C. F. Megow is president.

JACKSON, MICH.—The American Gear & Mfg. Co. will erect a plant addition, 169 x 280 feet, to cost $180,000.

KALAMAZOO, MICH.—The D'Arcy Spring Co. is completing an addition, 112 x 150 feet.

KALAMAZOO, MICH.—The Dearborn Equipment Co., capitalized at $50,000, recently was organized to manufacture garage equipment, by John H. Penniman and others.

MENOMINEE, MICH.—The Lloyd Mfg. Co. has purchased the plant of the Automatic Welding Co.

MUSKEGON, MICH.—The Shaw Electric Crane Co. contemplates an addition to double the capacity of its plant.

MUSKEGON, MICH.—The Shaw Crane Works contemplates a building expansion to enable the manufacturer of gas engines and machine tools.

SAGINAW, MICH.—The Michigan Crankshaft Co. is erecting a building, 120 x 600 feet.

SAGINAW, MICH.—The Erdman-Guider Co., manufacturer of auto bodies, is installing machinery in its new plant.

CHICAGO.—The Pullman Co., 79 East Adams street, contemplates a shop.

CHICAGO.—The Crane Co., 636 South Michigan avenue, will build a pipe shop, 193 x 375 feet.

CHICAGO.—The Mechanical Equipment Co. will erect a plant, 3-stories, 52 x 135 feet, to cost $60,000.

CHICAGO.—The Powell Steel Kitchen Co., 219 Loomis street, contemplates a factory building, 1-story, 86 x 144 feet, to cost $25,000.

CHICAGO.—The Simplex Windshield Wings Co. has been incorporated with $50,000 capital, by Robert Hartman, Henry Halbritter and Samuel N. Reiback.

EAST ST. LOUIS, ILL.—The Hussman Refrigerator & Butcher Supply Co. plans an office and factory building, 2-stories, 130 x 260 feet, to cost $100,000.

HARVEY, ILL.—The Buda Motor Co. plans a foundry, 40 x 160 feet, to cost $75,000.

JOLIET, ILL.—The Moore Bros. Co., Lewis Moore, president, is reported planning a foundry, 67 x 70 feet, to cost $20,000.

MARION, IND.—The Marion Gray Iron Foundry Co. is reported planning a warehouse, 1-story, 54 x 122 feet, to cost $10,000.

WEST PULLMAN, ILL.—The International Harvester Co., 606 South Michigan avenue, Chicago, contemplates a manufacturing building here.

CONNERSVILLE, IND.—The Lexington Motor Co. contemplates a foundry.

CRAWFORDSVILLE, IND.—The Crawfordsville Foundry Co. will build a foundry and machine shop consisting of three buildings, 1-story, 60 x 80 feet, 2-story, 60 x 80 feet, and 1-story, 20 x 40 feet, costing $20,000.

EVANSVILLE, IND.—The Advance Stove Works plans a foundry addition.

EVANSVILLE, IND.—The Imperial Desk Co. has had plans drawn for a factory and power house.

FT. WAYNE, IND.—The General Electric Co., Broadway and Wall streets, plans a tank, shop and garage, 1-story, 140 x 200 feet, at an estimated cost of $75,000.

HAMMOND, IND.—The American Iron & Metal Co. recently was incorporated with $10,000 capital, by Sam Abalman, John A. Gavit and James K. Stinson.

INDIANAPOLIS.—The Globe-Bosse-Wold Furniture Co. has plans for a power house, 60 x 80 feet.

INDIANAPOLIS.—The Imperial Drop Forge Co., 510 South Harding street, has had plans drawn for a power plant.

INDIANAPOLIS.—The Vonegut Machinery Co. is taking bids for a machinery warehouse, 2-stories, to cost $200,000.

INDIANAPOLIS.—The Robbins Body Corp., capitalized at $2,500,000, has been chartered to take over the plant and business of Irvin Robbins & Co., automobile body manufacturers.

MICHIGAN CITY, IND.—The Sheet Steel Products Co. recently was incorporated with $200,000 capital, to manufacture pressed steel, by Charles E. McBride, D. A. Crawford and K. S. Baxter.

RICHMOND, IND.—The Richmond Piston Ring Co. is reported contemplating a plant to cost $40,000.

SOUTH BEND, IND.—The Lock Joint Tube Co., capitalized at $100,000, has been chartered to manufacture metal tubing by Isadore Van Huffel, Isadore Woodka and Andrew Woodka.

SULLIVAN, IND.—The Mutual Truck Co. will build a 1-story addition, 100 x 300 feet, costing $40,000.

AKRON, O.—The Summit Mold & Machine Co. plans a machine shop to cost $30,000.

AKRON, O.—The Franz Foundry & Machine Co., recently incorporated with $400,000 capital, has taken over the Triumph Machine Shop at Barberton, O., and will manufacture rubber making machinery. C. Franz is president.

BUCYRUS, O.—The Ohio Brass Co. has plans for remodeling its foundry.

BUCYRUS, O.—Ground has been broken for an addition to the Bucyrus Machine & Tool Co. The building will be 36 x 120 feet.

CLEVELAND.—The Dangler Stove Co., 5017 Perkins avenue, plans a plant addition, 1-story, 50 x 200 feet, to cost $35,000.

CLEVELAND.—W. K. Smith, 66 Taylor road, East Cleveland, has plans for a foundry and machine shop, 100 x 120 feet, to cost $75,000.

CLEVELAND.—The Merit Machine Co. recently was incorporated with $200,000 capital, by Isador Grossman, N. M. Dochring and others.

CLEVELAND.—The Harvey Steel Products Co. has been incorporated with $120,000 capital, by George Higgins, Thomas H. Jones, Williamson building, W. R. Kinder, James P. Wood and H. O. Jones.

(*Concluded on Page* 1620)

Iron and Steel Prices

Corrected to Tuesday Noon

Iron Ore

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$6.45
Mesabi Bessemer, 55 iron	6.20
Old range non-Bess., 51½ iron	5.70
Mesabi non-Bes., 51½ iron	5.55

Manganese Ore

Brazilian, 45 to 50 per cent, c.i.f. Atlantic ports, 55c per unit, nominal.

Indian, 45 to 50 per cent, c.i.f. Atlantic ports, 55c per unit, nominal.

Warehouse Prices

Steel bars, Boston	4.00c
Steel bars, Chicago	3.37c
Steel bars, Cleveland	3.27c
Steel bars, Detroit	3.33c
Steel bars, Philadelphia	3.60c
Steel bars, New York	3.37c to 3.62c
Steel bars, St. Louis	3.44c
Steel bars, Cincinnati	3.33c
Steel bars, St. Paul	3.595c
Steel bars, Buffalo	3.365c
Iron bars, Boston	4.10c
Iron bars, Buffalo	3.95c
Iron bars, Chicago	3.37c
Iron bars, Detroit	3.33c
Iron bars, St. Louis	3.44c
Iron bars, Cincinnati	3.33c
Iron bars, Philadelphia	3.60c
Iron bars, New York	3.52c
Shapes, Chicago	3.47c
Shapes, Detroit	3.43c
Shapes, Boston	4.00c
Shapes, St. Louis	3.54c
Shapes, St. Paul	3.695c
Shapes, New York	3.47c
Shapes, Cleveland	3.37c
Shapes, Philadelphia	3.70c
Shapes, Buffalo	3.55c
Shapes, Cincinnati	3.43c
Plates, Buffalo	3.665c
Plates, Chicago	3.67c
Plates, Detroit	3.63c
Plates, Boston	3.95c
Plates, St. Louis	3.74c
Plates, St. Paul	3.895c
Plates, New York	3.67c
Plates, Cleveland	3.57c
Plates, Philadelphia	3.90c
Plates, Cincinnati	3.63c
No. 10 blue anl. sheets, N. Y.	4.82c to 6.00c
No. 10 blue anl. sheets, Phila.	5.00c
No. 10 blue anl. sheets, Chicago	4.57c
No. 10 blue anl. sheets, Cleveland	4.47c
No. 10 blue anl. sheets, Boston	5.30c
No. 10 blue anl. sheets, Buffalo	4.565c
No. 10 blue anl. sheets, St. L.	4.64c
No. 10 blue anl. sheets, Cincinnati	4.53c
No. 10 blue anl. sheets, St. Paul	4.79c
No. 10 blue anl. sheets, Detroit	4.53c
No. 28 black sheets, Chicago	5.62c
No. 28 black sheets, New York	6.00c to 7.50c
No. 28 black sheets, Phila.	6.00c
No. 28 black sheets, Cleveland	5.27c
No. 28 black sheets, Boston	7.65c
No. 28 black sheets, Cincinnati	4.93c
No. 28 black sheets, Detroit	5.58c
No. 28 black sheets, St. Louis	5.69c
No. 28 black sheets, St. Paul	5.845c
No. 28 black sheets, Buffalo	5.865c
No. 28 galv. sheets, Chicago	6.97c
No. 28 galv. sheets, New York	7.25c to 9.50c
No. 28 galv. sheets, Phila.	7.50c
No. 28 galv. sheets, Boston	9.00c
No. 28 galv. sheets, Cleveland	6.62c
No. 28 galv. sheets, Cincinnati	6.28c
No. 28 galv. sheets, Detroit	6.93c
No. 28 galv. sheets, Buffalo	7.215c
No. 28 galv. sheets, St. Louis	7.04c
Bands, New York	4.22c
Bands, Boston	5.20c
Bands, Detroit	4.03c
Bands, Buffalo	4.065c
Hoops, Buffalo	4.065c
Hoops, Boston	5.45c
Hoops, New York	4.47c
Hoops, Detroit	4.03c
Cold rolled shafting, Buffalo	4.85c
Cold rolled shafting, New York	5.90c
Cold rolled flats, squares and hexagons, New York	5.50c

Sheet Schedule—(Black)

Differentials for gage, per 100 pounds.

No. 30	+20c
No. 29	+10c
No. 28 (carloads)	Base
No. 27	—05c
Nos. 25-26	—10c
Nos. 22-24	—15c
Nos. 17-21	—20c
Nos. 15-16	—25c
Nos. 13-14	—30c
Nos. 10-12	—35c

Standard Sizes

Gages Nos. 12 to 30 inclusive, 24, 26, 28 and 30 inches wide by 72, 84, 96 and 120 inches long. Gages Nos. 14 to 28 in addition to the foregoing, 36 wide by 96 inches and 120 inches long. Extras for width and length to be added.

Galvanized and Long Terne

Differentials for gage, per 100 pounds.

No. 30	+50c
No. 29	+25c
No. 28 (carloads)	Base
No. 27	—15c
Nos. 25-26	—30c
Nos. 22-24	—45c
Nos. 17-21	—60c
Nos. 15-16	—75c
Nos. 12-14	—90c
Nos. 10-11	—1.00

Standard Sizes

Gages Nos. 12 to 30 inc., 24, 26, 28, 30 and 36 in. wide by 72, 84, 96 and 120 in. long. Extras for width and length to be added.

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$1.40
Newark, N. J.	4.80
Boston	5.20
Philadelphia	4.40
Pittsburgh	1.40
St. Louis	4.60
Minneapolis, St. Paul	5.70

Buffalo to:

Albany, N. Y.	$1.80
New England (rail)	3.90
New York and Brooklyn (rail)	3.90

Virginia furnaces to:

Philadelphia	$4.10
New England	4.70
Brooklyn, Jersey City, Newark	4.40

Birmingham, Ala., to:

Boston	$8.00
Cincinnati	3.60
Chicago	5.00
Cleveland	5.00
Louisville, Ky.	3.30
Minneapolis, St. Paul	7.30
New York	7.70
Philadelphia	6.50
Pittsburgh	5.70
Savannah, Ga.	3.40

Chicago to:

St. Louis	4.25
Des Moines	$3.50
Minneapolis, St. Paul	2.50
Milwaukee	.60
Moline, Ill.	1.40
Omaha	4.50
St. Louis	1.90

Ironton and Jackson, O., to:

Chicago	$3.80
Cincinnati	1.80
Cleveland	2.40
Detroit	.60
Indianapolis	2.30
Minneapolis, St. Paul	5.70

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	27.0 cents
Philadelphia	24.5 cents
Boston	30.0 cents
Buffalo	21.5 cents
Baltimore	23.0 cents
Cleveland	17.0 cents
Cincinnati	23.0 cents
Chicago	27.0 cents
Detroit	23.0 cents
Minneapolis and St. Paul	49.5 cents
Denver	$1.09
St. Louis	33.5 cents
New Orleans	38.5 cents
Birmingham	57.5 cents
Pacific coast (all rail)	1.25
Pacific coats (tin plate)	1.25

Blue Annealed

Differential for gage per 100 pounds

Nos. 8 and heavier	— 5c
Nos. 9 and 10 (carloads)	Base
Nos. 11 and 12	+ 5c
Nos. 13 and 14	+10c
Nos. 15 and 16	+20c

Standard Sizes

Widths—24-26-28-30-36 and 48 inches.
Lengths—72-84-96-120 and 144 inches.
Extras for width and length to be added.

Tubular Goods

Steel Pipe

Pittsburgh basing discounts to jobbers in carloads

STANDARD WEIGHT

Butt Weld	Black	Galv.
⅛, ¼ and ⅜-inch	50½	24
½-inch	54½	40
¾ to 3-inch	57½	44
Lap Weld		
2-inch	50½	38
2½ to 6-inch	53½	41
7 to 12-inch	50½	37
13 to 14-inch	41	..
15-inch	38½	..

PLUGGED AND REAMED

Butt Weld		
1 to 3-inch	55½	42
2-inch	48½	36
Lap Weld		
2½ to 6-inch	51½	39

EXTRA STRONG PLAIN ENDS

Butt Weld		
⅛, ¼ and ⅜-inch	46½	29
½-inch	51½	39
¾ to 1½-inch	55½	43
2 to 3-inch	56½	44
Lap Weld		
2-inch	48½	37
2½ to 4-inch	51½	40
4½ to 6-inch	50½	39
7 to 8-inch	46½	33
9 to 12-inch	41½	28

DOUBLE EXTRA STRONG PLAIN

Butt Weld		
½-inch	42½	32
¾ to 1½-inch	45½	35
2 to 2½-inch	47½	37
Lap Weld		
2-inch	40½	31
2½ to 4-inch	42½	33
4½ to 6-inch	41½	32
7 to 8-inch	36½	23

Wrought Iron Pipe

Pittsburgh basing discounts to jobbers in carloads

THREADS AND COUPLINGS

Butt Weld	Black	Galv.
⅛-inch	1	+14
¼-inch	24½	+ 2½
⅜-inch	25½	+ 1½
½-inch	29½	11½
¾ to 1½-inch	34½	18½
Lap Weld		
2-inch	28½	14½
2½ to 6-inch	30½	17½
7 to 12-inch	27½	14½

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG PLAIN ENDS

Butt Weld		
⅛, ¼-inch	+21	+36
⅜-inch	23½	6½
½-inch	28½	15½
¾ to 1½-inch	34½	19½
Lapp Weld		
2-inch	29½	16½
2½ to 4-inch	31½	19½
4½ to 6-inch	30½	18½
7 and 8-inch	22½	10½
9 and 12-inch	17½	5½

DOUBLE EXTRA STRONG PLAIN ENDS

Butt Weld	Balck	Galv.
½-inch	15½	3½
¾ to 1½-inch	20½	8½
Lap Weld		
2-inch	16½	4½
2½ to 4-inch	18½	9½

Lapweld Boiler Tubes

Discounts off manufacturers' standard list, in carloads; less carloads, 4 points less.

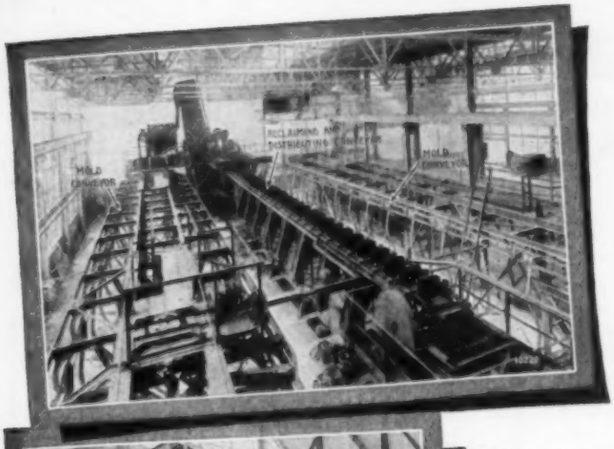
Steel

1¾ and 2-inch	19
2¼-inch	24
2½ to 3¼-inch	30½
3½ to 4½-inch	40½

Iron

1¾-inch	+20
2 and 2¼-inch	+10
2½ and 2¾-inch	+ 1
3 and 3¼-inch	— 1½
3½ to 4½-inch	—16

LINK-BELT

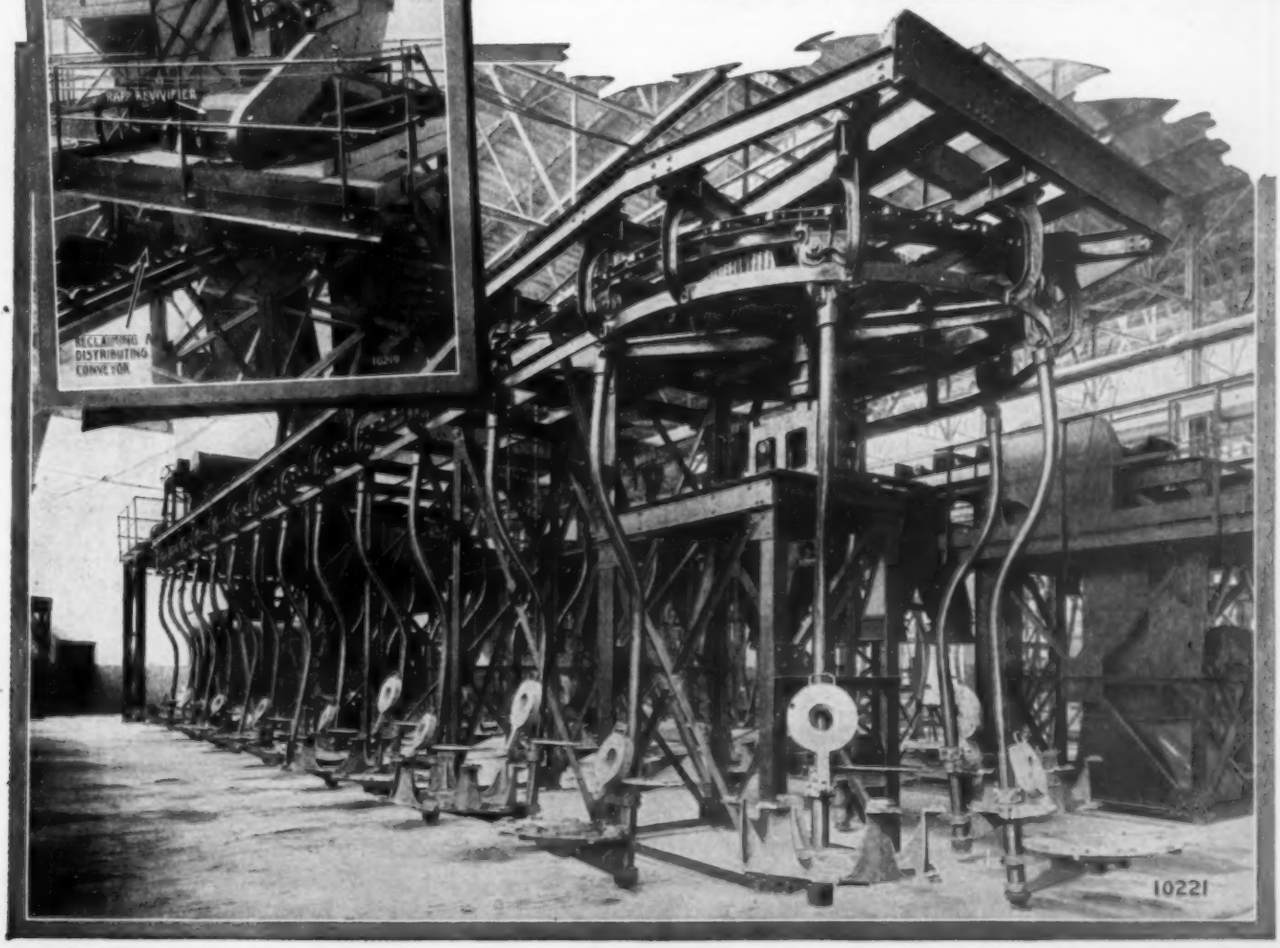


Labor-Saving Conveyors for the Modern Foundry

WITH modern Link-Belt Labor-Saving machinery, it is possible to increase the output of the foundry—with less labor. Foundrymen in general are realizing with increasing certainty that machinery of this type, when properly designed and built, and well taken care of, is fully as necessary an adjunct, and as reliable and economical in operation, as any other foundry equipment, such as ladle cranes, blowers, etc.

We invite foundry operators, when planning new foundries, or making changes in old foundries, to avail themselves of our special engineering service, to insure that suitable provisions for the proper machinery are made.

Write for our Book No. 390.



LINK-BELT COMPANY 416

PHILADELPHIA		CHICAGO		INDIANAPOLIS	
New York	299 Broadway	Huntington, W. Va.,	Robson-Prichard Bldg.	San Francisco	582 Market St.
Boston	49 Federal St.	Cleveland	420 Rockefeller Bldg.	Los Angeles	153 N. Los Angeles St.
Pittsburgh	1501 Park Bldg.	Detroit	922 Dime Bank Bldg.	Toronto, Can.	Canadian Link-Belt Co., Ltd.
St. Louis, Central Nat'l Bank Bldg.		Kansas City, Mo.	306 Kimbark Bldg.	Denver, Lindroth, Shubart & Co., Boston Bldg.	
Buffalo	547 Ellicott Square	Seattle	576 1st Ave. S.	Louisville, Ky.	F. Wehle, Starks Bldg.
Wilkes-Barre, 2nd Nat'l Bank Bldg.		Portland, Ore.	First and Stark Sts.	New Orleans	C. O. Hiss, Hibernia Bank Bldg.
		Birmingham, Ala.	S. L. Morrow, 720 Brown-Marx Bldg.		

Iron and Steel Scrap Prices

Corrected to Tuesday Noon

Steel Works Scrap

Gross Tons Delivered to Consumer

HEAVY MELTING STEEL

Pittsburgh	$24.50 to 25.00
Chicago	21.00 to 21.50
Eastern Pennsylvania	23.00 to 25.00
Cleveland	20.50 to 21.00
St. Louis	22.00 to 22.50
Buffalo	23.00 to 23.50
New York (dealers)	18.50 to 19.00
Cincinnati	18.50 to 19.00
Birmingham	20.00 to 21.00
Valleys	22.75 to 23.00
Boston (dealers)	17.50 to 18.00

BUNDLED SHEETS

Pittsburgh	17.50 to 18.00
Eastern Pennsylvania	18.50 to 19.00
Cleveland	13.50 to 14.00
Buffalo	15.50 to 16.00
Cincinnati	13.50 to 14.00
St. Louis	13.50 to 14.00

STEEL RAILS, SHORT

Chicago	$25.50 to 26.00
Boston (dealers)	15.50 to 16.00
Cleveland	19.00 to 20.00
St. Louis	24.50 to 25.00
Birmingham	21.00 to 22.00
Cincinnati	22.00 to 22.50
Eastern Pennsylvania	22.50 to 23.00

STOVE PLATE

Pittsburgh	$22.00 to 23.00
Chicago	29.25 to 29.75
Eastern Pennsylvania	22.50 to 23.50
Cleveland	22.00 to 23.00
St. Louis	27.00 to 27.50
Buffalo	23.00 to 23.50
New York	20.50 to 21.00
Cincinnati	20.50 to 21.00
Birmingham	22.00 to 23.00
Boston	22.00 to 23.00

LOW PHOSPHORUS

Pittsburgh, billet and bloom crops	$27.00 to 28.00
Chicago, billet and bloom crops	24.00 to 25.00
Eastern Penn. (guaranteed)	27.00 to 29.00
Buffalo	27.00 to 28.00

SHOVELING STEEL

Chicago	$20.50 to 21.00
St. Louis	21.00 to 21.50

KNUCKLES, COUPLERS AND SPRINGS

Pittsburgh	$24.50 to 25.00
Chicago	24.50 to 25.00
St. Louis	24.00 to 24.50

BALED SHEETS

Pittsburgh	21.00 to 21.50
Chicago	15.50 to 16.00

FROGS, SWITCHES, GUARDS

Chicago	21.00 to 21.50
St. Louis	22.50 to 23.00
Eastern Pennsylvania	23.00 to 25.00

BOILER PLATE, CUT

Chicago, No. 1	$19.00 to 19.50
St. Louis	17.00 to 17.50

ANGLE BARS—STEEL

Chicago	$24.50 to 25.00
St. Louis	23.00 to 23.50

Iron Mill Scrap

Gross Tons Delivered to Consumer

RAILROAD WROUGHT

Pittsburgh, No. 1	$26.00 to 27.00
Pittsburgh, No. 2	24.50 to 25.00
Chicago, No. 1	27.00 to 28.00
Chicago, No. 2	23.00 to 23.50
Eastern Pennsylvania, No. 1	30.00 to 32.00
Cleveland, No. 1	24.50 to 25.00
St. Louis, No. 1	25.00 to 25.50
St. Louis, No. 2	24.00 to 24.50
Buffalo	24.00 to 24.50
Cincinnati, No. 1	21.50 to 22.00
Birmingham, No. 1	20.00 to 21.00
New York, No. 1 (dealers)	27.00 to 27.50
Boston (dealers)	26.00 to 26.50

WROUGHT PIPE

Eastern Pennsylvania	$22.00 to 23.00
Eastern Pennsylvania, ungraded	17.00 to 18.00
Buffalo	18.50 to 19.00
New York (dealers)	18.50 to 19.00
Boston (dealers)	17.50 to 18.00

YARD WROUGHT

Eastern Pennsylvania, No. 1	$26.00 to 27.00

CITY WROUGHT

New York, long (dealers)	21.00 to 22.00

BUSHELING

Chicago, No. 1	$20.00 to 20.50
Chicago, No. 2	16.00 to 16.50
Cleveland, No. 1	18.50 to 19.00
Cleveland, No. 2	15.00 to 15.50
St. Louis, No. 1	22.00 to 22.50
Buffalo, No. 1	20.00 to 21.00
Cincinnati, No. 1	16.50 to 17.00
Eastern Pennsylvania, No. 1	20.00 to 21.00

MACHINE SHOP TURNINGS

Pittsburgh	$15.00 to 15.50
Chicago	12.00 to 12.50
Eastern Pennsylvania	18.50 to 19.50
Eastern Pennsylvania (blast furn.)	17.00 to 18.00
Eastern Pennsylvania (chemical)	24.00 to 25.00
Cleveland	12.50 to 13.00
Buffalo	14.50 to 15.00
New York (dealers)	14.00 to 14.50
St. Louis	15.00 to 15.50
Cincinnati	7.50 to 8.00
Birmingham	12.00 to 13.00
Valleys	13.50 to 14.00
Boston (dealers)	14.00 to 14.50
Boston (blast furnace) (dealers)	11.50 to 12.00

CAST IRON BORINGS

Pittsburgh	$18.00 to 18.50
Chicago	13.75 to 14.25
Eastern Pennsylvania	22.00 to 23.00
Eastern Pennsylvania (chemical)	24.00 to 25.00
Cleveland	16.00 to 16.50
St. Louis	13.00 to 13.50
Buffalo	17.50 to 18.00
New York (dealers' price)	16.50 to 17.00
Cincinnati	11.00 to 11.50
Birmingham	12.00 to 13.00
Valleys	17.50 to 17.75
Boston (dealers)	16.00 to 17.00
Boston (blast furnace) (dealers)	11.50 to 12.00

IRON AXLES

Pittsburgh	$44.00 to 45.00
Chicago	39.50 to 40.50
Eastern Pennsylvania	40.00
Cleveland	35.00 to 36.00
St. Louis	36.50 to 37.00
Buffalo	33.00 to 34.00
Cincinnati	23.00 to 23.50
Birmingham	29.00 to 30.00

IRON RAILS

Chicago	28.50 to 29.00
Cleveland	27.00 to 28.00
St. Louis	27.00 to 27.50
Buffalo	25.00 to 26.00
Cincinnati	23.00 to 23.50

PIPES AND FLUES

Chicago	21.75 to 22.25
Cleveland	17.50 to 18.00
St. Louis	20.00 to 20.50
Cincinnati	15.00 to 15.50

GRATE BARS

Chicago	28.50 to 29.00
Cleveland	22.00 to 23.00
Buffalo	21.00 to 21.50
New York	17.50 to 19.00
Eastern Pennsylvania	25.00 to 26.00

FORGE FLASHINGS

Cleveland, large	$16.75 to 17.25
Cleveland, small	18.00 to 18.50
Chicago, small	17.00 to 17.50
Boston (dealers)	13.00 to 14.00

FORGE SCRAP

Chicago	22.50 to 23.00
Eastern Pennsylvania, No. 1	17.50 to 18.50
Boston	14.00 to 14.50

ARCH BARS AND TRANSOMS

Chicago	32.50 to 33.00
St. Louis	29.00 to 30.00

ANGLE BARS—IRON

Chicago	$31.00 to 31.50
St. Louis	26.00 to 26.50

Iron and Steel Works Scrap

Gross Tons Delivered to Consumer

AXLE TURNINGS

Pittsburgh	$18.00 to 18.50
Eastern Pennsylvania	19.00 to 20.00
Boston (dealers)	15.00 to 15.50
St. Louis	16.00 to 16.50
Cleveland	19.00 to 19.50
Buffalo	17.50 to 18.00
Chicago	17.50 to 18.00

STEEL CAR AXLES

Pittsburgh	$32.00 to 33.00
Eastern Pennsylvania	32.00
Cleveland	34.00 to 35.00
St. Louis	34.00 to 34.50
Buffalo	33.00 to 34.00
Chicago	33.50 to 34.50
New York (dealers)	28.00
Birmingham	28.00 to 29.00
Boston (dealers)	27.00 to 28.00

SHAFTING

Eastern Pennsylvania	$26.00 to 28.00
St. Louis	31.00 to 31.50
New York (dealers)	26.00 to 27.00
Chicago	30.00 to 30.50

Iron Foundry Scrap

Gross Tons Delivered to Consumer

CAR WHEELS

Pittsburgh, iron	$31.00 to 32.00
Pittsburgh, steel	24.50 to 25.00
Chicago, iron	29.50 to 30.00
Eastern Pennsylvania, iron	29.00 to 30.00
Cleveland, iron	26.00 to 27.00
St. Louis, iron	26.00 to 26.50
Buffalo, iron	27.00 to 27.50
Birmingham, iron	26.00 to 27.00
Birmingham, tram car	26.00 to 27.00
Boston	25.00 to 26.00
Cincinnati	21.50 to 22.00

NO. 1 CAST SCRAP

Pittsburgh, cupola	$30.00 to 31.00
Chicago, cupola	34.50 to 35.00
Eastern Pennsylvania, cupola	31.00 to 32.00
Cleveland, cupola	30.00 to 30.50
New York, cupola (dealers)	27.00 to 28.00
Cincinnati, No. 1, cupola	25.00 to 25.50
Birmingham, cupola	26.00 to 27.00
St. Louis, railroad	32.00 to 32.50
St. Louis, agricultural	32.00 to 32.50
Buffalo	27.00 to 27.50
Boston	34.00 to 35.00
Valleys	30.00 to 31.00

HEAVY CAST

New York (dealers)	24.00 to 25.00
Buffalo	21.00 to 22.00
Pittsburgh	25.00 to 26.00
Cleveland	23.00 to 24.00
Boston	28.00 to 28.50

MALLEABLE

Pittsburgh, railroad	$25.00 to 26.00
Pittsburgh, agricultural	22.00 to 23.00
Chicago, railroad	28.00 to 29.00
Chicago, agricultural	28.50 to 29.00
Eastern Pennsylvania, railroad	25.00 to 27.00
Cleveland, railroad	25.50 to 26.00
Cleveland, agricultural	18.50 to 19.00
St. Louis, railroad	24.50 to 25.00
St. Louis, agricultural	23.50 to 24.00
Cincinnati, railroad	17.00 to 17.50
Cincinnati, agricultural	16.50 to 17.00
Boston, railroad	23.00 to 24.00
Buffalo	22.50 to 23.50

Miscellaneous Scrap

Gross Tons Delivered to Consumer

RE-ROLLING RAILS

5 feet and over

Pittsburgh	$30.00 to 31.00
Chicago	31.50 to 32.00
Eastern Pennsylvania	32.00
Cleveland	28.50 to 29.00
St. Louis	32.50 to 33.00
Birmingham	27.00 to 28.00
Boston (dealers)	26.00 to 27.00

LOCOMOTIVE TIRES

Chicago	23.50 to 24.00
St. Louis	23.00 to 23.50

BOILER PUNCHINGS

Chicago	$26.00 to 27.00
Eastern Pennsylvania	27.00 to 28.00

A Repeater

Not a rifle but another invitation to give us an opportunity to figure with you whenever you are in the market to buy your scrap requirements or to sell the scrap which you produce.

See us
Concerning your
Requirements
And our
Prices

MILLCO
SERVICE

Sell
Carloads
Right
And be
Pleased

The James S. Miller Company
McCormick Bldg. Chicago.

(*Concluded from Page* 1615)

DAYTON, O.—The Mead Pulp & Paper Co. plans a machine shop, 2-stories, 60 x 250 feet.

DAYTON, O.—The Valle-Kimes Co., pump makers, has reincorporated as a $1,000,000 company. Plans are under way for the erection of a large plant.

DAYTON, O.—New equipment will enter into a 3-story building to be erected by the Stanley Mfg. Co. Company makes perfume bottle labels and thin metal labels for machinery.

DAYTON, O.—The Dayton Tractor Co. has been incorporated with capitalization of $250,000 and plans to manufacture tractors. E. A. Brenneman, Harry Gascho, J. E. Allen, Isaac Warner and A. M. Inderbitzen are the incorporators.

DAYTON, O.—The Miami Brass Foundry and Miami Mfg. Co., each headed by Ben Semmelman, will erect a 3-story plant. The companies have installed core ovens giving capacity of drying 150,000 pounds of sand core per day. New furnace equipment and ten molding machines have been installed.

DAYTON, O.—Educational Toy Mfg. Co., capitalized at $25,000, has decided to locate in Dayton instead of Springfield, Mass., and has taken over the Custer machine shop, 28 North Ludlow street. The company will purchase punch presses and other mechanical equipment. Joseph Vehan, Springfield, Mass., is president, and W. H. Robertson, general manager.

DAYTON, O.—William Dennick & Co., 1415 East Fifth street, manufacturers of heavy and light bronze castings, are erecting a 2-story addition to their foundry, the upper floor to be used as a core room, dressing room and racks for core boxes, while the lower floor will be divided into two sections, one part to be used as an office while the other will be used for machinery and shipping rooms. In addition to the addition, the company is modernizing all its equipment.

MANSFIELD, O.—The Barnes Mfg. Co. plans a machine shop addition, 2-stories, 22 x 126 feet, to cost $30,000.

NEWARK, O.—The Ohio Sash Weight Co. recently was incorporated with $15,000 capital, by M. J. MacDonald, N. E. Hones and others.

NILES, O.—The Kennedy Reiter Co. has been incorporated by Myron Kennedy, Clarence Reiter and others, and will manufacture metal products.

NORTH CANTON, O.—Work on an addition for the Hoover Suction Sweeper Co. is being rushed to completion. The building will be 80 x 170 feet.

TOLEDO, O.—The Acme Specialty Co. plans a manufacturing building, 3-stories, 45 x 100 feet, to cost $45,000.

TOLEDO, O.—The Krenz Boiler Works has been incorporated with $20,000 capital, by Reinhold W. Krenz, M. K. Kureth and others.

WASHINGTON COURT HOUSE, O.—The Fayette Sand & Gravel Co. has been incorporated with $25,000 capital, by G. D. Baker, George A. Hyer, H. C. Hosier and others.

LEXINGTON, KY.—This city proposses to build a sewage reduction plant.

LOUISVILLE, KY.—The Frank Fehr Coal Storage Co. has had plans prepared for a $1,000,000 coal storage plant.

LOUISVILLE, KY.—The Kentucky Color & Chemical Co. has been organized with $70,000 capital by A. W. Clark, G. A. Goodell and others and will build a plant.

LOUISVILLE, KY.—The Byron Engineering Works has been organized by O. E. Byron and others, and plans are being made for a plant to be devoted to the manufacture of truck trailers.

PIKEVILLE, KY.—The Kentucky & West Virginia Power Co. will purchase equipment for its plant.

ASHLAND, W. VA.—The Ashland Coal & Coke Co. will build a $200,000 tipple and mining plant. W. A. Phillips is general manager.

HUNTINGTON, W. VA.—The Stoody Machine Co. has been incorporated with $5000 capital, by C. H. Stoody, J. S. Myers, R. Bias, S. M. Stoody and W. F. Stoody.

MOUNDSVILLE, W. VA.—The United Zinc Smelting Co. contemplates a plant at an estimated cost of $300,000.

MOUNDSVILLE, W. VA.—C. D. Keyser has the contract to erect a plant for the United States Stamping Co.

POWHATAN, W. VA.—The Mohawk Coal & Coke Co. is arranging to make additions to its mining plant.

LOGAN, W. VA.—The Kentucky & West Virginia Power Co. is having plans prepared for a boiler house and power plant additions. H. T. Hartmann, Land Title building, Philadelphia, is general manager.

WARWOOD, W. VA.—The United States Corrugated Fibre Co. will start work early next spring on additions to its plant.

Business in Canada

LAKE TEMISKAMING, QUE.—M. J. O'Brien, Ltd., Union Bank building, Ottawa, Ont., is making arrangements for pulp and paper mills and hydro electric power development here.

LATUQUE, QUE.—The Brown Corp., Ltd., will make improvements to its power plant.

MONTREAL, QUE.—The St. Maurice Power Co., Ltd., has been incorporated to build and operate power plants, hydro electric systems, etc., with $6,500,000 capital, by Howard Murray, William S. Hart, Julian C. Smith and others.

BRANTFORD, ONT.—The Dominion Steel Products Co. is having plans prepared for a manufacturing plant here. W. P. Kellett is manager.

CROWLAND, ONT.—E. J. Pratt, clerk, Welland, Ont., is receiving bids for extension to waterworks plant here to cost $12,000. George Ross is engineer.

GALT, ONT.—The Perfect Machine Co. will start building operations on an addition to cost $50,000.

HAMILTON, ONT.—A permit has been issued to the B. Greening Wire Co. to erect a 4-story addition to its plant, to cost $40,000.

LARDER LAKE, ONT.—The Associated Gold Fields Mining Co., Toronto, Ont, will build a 5000-ton mill.

LONDON, ONT.—The London & Port Stanley railway will make improvements and will make improvements and will require equipment for its system at London, Port Stanley and St. Thomas, Ont., to cost $300,000.

SARNIA, ONT.—The Holmes Foundry Co. will build an addition.

ST. CATHARINES, ONT.—W. P. Near is calling for bids for the construction of a sewage disposal plant here. J. Albert Pay is clerk.

TORONTO, ONT.—The Automatic Scale Co., Ltd., has been incorporated to manufacture scales, etc., with $40,000 capital, by William H. Male, room 39, 33 Richmond street west; Harworth Atkinson and others.

TORONTO, ONT.—S. McCord & Co., Ltd., have been incorporated to manufacture builders' supplies, machinery, etc., with $100,000 capital, by Samuel McCord, 696 Queen street east; George S. McCord and others.

TORONTO, ONT.—The Canadian Mine Shovel Co., Ltd., has been incorporated to manufacture tunnelling machinery, mechanical shovels, etc., with $100,000 capital, by Charles B. Jackes, room 202, Lumsden building, Horace M. Jackes and others.

New Trade Publications

MACHINE TOOLS.—Turret lathes, horizontal boring and drilling machines, vertical boring mills, universal tool grinders, etc., are described and illustrated in a 4-page circular recently published by the Gisholt Machine Co., Madison, Wis. General data pertaining to each machine are given.

BARGES.—The Dravo Contracting Co., Pittsburgh, has published a booklet in which a paper entitled "Barges for Interior Waterways," is given. This paper was read before the Mississippi-to-Atlantic Inland Waterways Convention at Pittsburgh, Jan., 1919, by F. R. Dravo, president of the company. The booklet is profusely illustrated.

OIL ENGINES.—The Allis-Chalmers Mfg. Co. has published bulletin No. 1532-A, in which oil engines of the diesel type are described and illustrated. The operation and construction of these engines are given in a thorough way and the numerous line drawings and illustrations give the reader a comprehensive idea of these engines.

COMBUSTION.—A booklet, entitled "Securing Better Combustion of Mid-West, Western and Southwestern Fuels," has been published by the Green Engineering Co., East Chicago, Ind. Many problems which arise in securing efficient combustion with fuels from the districts mentioned in the title, are discussed in the various articles appearing in the booklet, and which are reprints from *Power* and *Electrical World*.

CONDENSER EQUIPMENT.—A revised and enlarged bulletin entitled "Condensers, Pumps, Cooling Towers, etc.," has been published by the Wheeler Condenser & Engineering Co., Carteret, N. J. The bulletin illustrates and describes late developments in condenser practice. Illustrations and descriptions of surface condensers, jet condensers, barometric condensers, air pumps, centrifugal pumps, rotative dry vacuum pumps, turbo-air pumps, steam jet air pumps, natural and forced draft cooling towers, feed water heaters, evaporators and dryers are given.

STARTING SWITCH.—The Electric Controller & Mfg. Co., Cleveland, is circulating a 4-page leaflet in which a starting switch for small induction motors is described and illustrated. This switch is built to handle motors up to and including three horsepower, 110 volts, or 7½ horsepower, 220, 440 or 550 volts. Overload protection is supplied by two special alloy wires stretched along the left side of the slate. They open the circuit to the motor quickly if the overload is excessive and introduces a delay if the overload is only slight.

OPTICAL PYROMETER.—The Leeds & Northrup Co., Philadelphia, has issued a catalog in which an optical pyrometer for works temperature measurements, is described and illustrated. Its practical application in gaging temperatures in muffle furnaces, electric furnaces, in the open, in fuel beds, heat-treating furnaces, the rolling and forging of steel, blast furnaces, of molten steel and slag, molten cast iron, molten nonferrous metals, molten glass, in ceramic furnaces, etc., and for checking thermocouple pyrometers are given.